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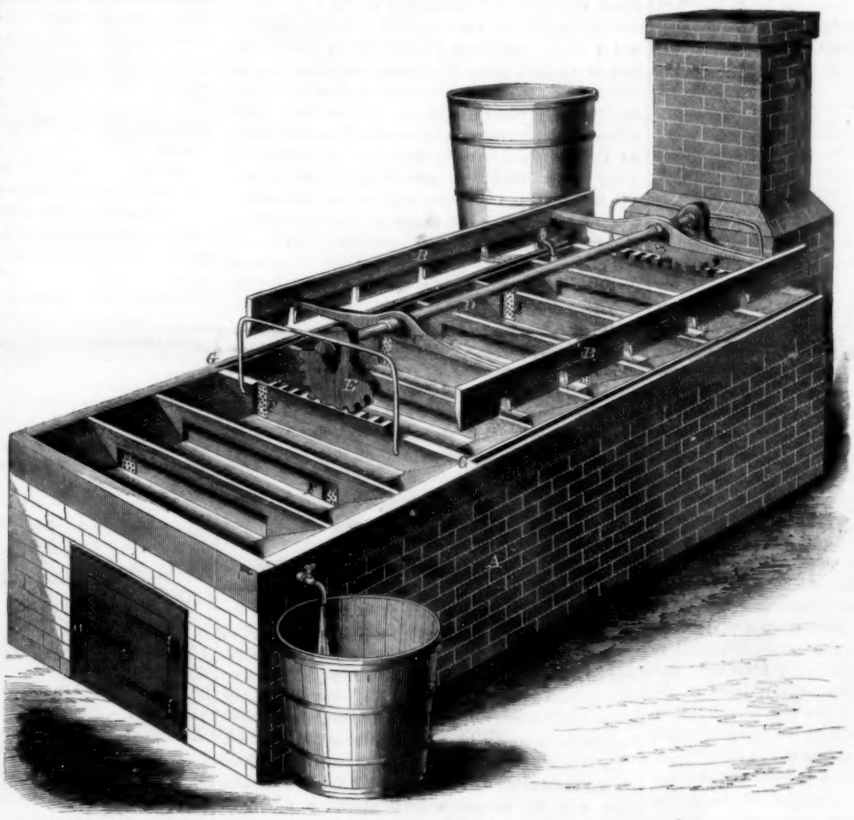
### Improved Evaporating Pan.

The interests of a large portion of the community are at present turned toward manufacturing sugar from sorghum or northern cane. The article thus far produced has not been brought to market in sufficient quantities to be ranked as a staple, but it is increasing in importance every year, and after the growing crop is reaped it will be manufactured extensively. We illustrate this week an improved apparatus for boiling the juice, which presents some novel features. The pan is set in the furnace, A, and has a metallic bottom which is divided by a number of wooden partitions into several compartments. In the partitions devoted to boiling the juice, there is a skimmer, B, fitted. This skimmer consists of two long boards fastened to projecting arms, C. These arms proceed from a central shaft, D, on which is keyed two toothed quadrants, E, working in racks placed on one of the partitions. There are a number of perforated plates placed over the apertures, F, in in the partitions, which, through the medium of a gate, regulate the quantity of juice admitted from one compartment to the other. The inclined sides of the pan form an important part of the invention, as it is asserted that the natural tendency of the boiling liquid is to deposit the scum and sediment on these, from whence it is easily removed in an obvious manner by the skimmer. The operator takes hold of one side of this appliance, and inserting the board in the scum, draws it toward him and throws it into the trough, G, on the side, from whence it flows into a proper receptacle. The same process can be repeated as to the other side of the pan without leaving the spot, so that bythe addition of this skimmer the condition of the liquid is at all times under control. The sugaring-off is completed in the pans over the furnaces, and the height of the chimney can be increased if required. These features are novel and practical, and facilitate very much the operation of boiling down.



BOWLUS'S PATENT EVAPORATING PAN.

The patent for this invention was procured through the Scientific American Patent Agency, on April 28, 1863, by J. A. Bowlus, of Fremont, Ohio. Further information can be obtained by addressing him as above.

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WITH DISPATCH!—Quite recently the steamer *Scotia* was captured while endeavoring to run the blockade; she was condemned at a prize court and sold by the Government. Mr. Ben. Wier, of Halifax, purchased her and she is now ready to run the blockade again. We hope a similar fate to her previous one awaits her.

### SCIENCE IN SHIPBUILDING.

It has hitherto been the common theory respecting naval architecture, that the speed of a vessel under a given power is mainly dependent upon what are known as her "water-lines," or shape from stem to stern. The main study of shipbuilders has, therefore, been to perfect these lines so as to diminish resistance and avoid the formation of eddies while the vessel is in motion. Probably they have reached perfection of model in this respect; but much room was still left for improvement in another important particular. The weight and inertia of the water to be displaced by the vessel, does not constitute the whole of the resistance to be overcome. A large additional amount arises from the friction between the water and the entire submerged surface of the vessel. This is due to the viscidity which water possesses in common with all fluids. A film of water adheres to the entire submerged surface, and when the vessel is moved there is a resistance to be overcome, arising from the cohesion of the particles constituting the film with the particles lying next to them. Of course, this resistance will be overcome in proportion as the submerged surface is diminished. It thus seems highly important to form such transverse sections of a vessel as shall, with the maximum area or contents below the water-line, afford the minimum extent of boundary line or wetted surface. This problem forms the subject of a paper lately read before the Glasgow Philosophical Society by James R. Napier. In the construction of vessels whose breadth and depth of water are not limited, the question reduces itself to the common mathematical problem of passing a curve of given length through two points, so as to enclose the greatest area between the curve and the straight line joining the points. But when the breadth and draft of water are limited, as by the width of dock entrances and the depth of rivers, the problem is far more complicated. The given dimensions of breadth and depth afford a rectangular space within which it is required to enclose the greatest area with the least extent of boundary—wetted surface of the vessel. A transverse section of a vessel thus constructed will afford the greatest displacement or capacity below the water-line, with the least surface for friction. The breadth and draft being thus given, the problem is to find the radius of curvature, or radius of bilge, which will afford the shortest boundary enclosing the greatest area—the line which will secure the greatest carrying capacity with the least frictional surface. As this radius is formed in terms of the breadth and depth, it can be applied to the construction of all the transverse sections from the stem to the stern of a vessel. It does not interfere with the water-lines, and thus these "sections of least resistance" may be introduced into a vessel having water-lines of any desired model. We can scarcely do more in this article than indicate the general process by which this "radius of bilge" is found. Such a curve is to be found as will enclose the greatest area with the least boundary. Of course this area, divided by the proposed boundary, must be a maximum. By the methods of analytical geometry we first find this proposed area in terms of the proposed breadth and depth and radius (the latter as yet being an unknown quantity). In the same manner we find the proposed boundary in the same terms, the unknown radius being likewise involved. Placing the value of the area as a numerator, and the value of the boundary as a denominator, we have a fraction of which we have now to find the maximum value. This is readily done by the methods of the differential calculus. A quadratic equation appears in which the radius is the unknown quantity. Solving this equation, we find the value of the radius in the known terms of breadth and draft. This is the radius of curvature which will afford a maximum area below the water-line of a vessel with a minimum amount of surface. The following are some values of this radius, for given breadths and depths:—

1. When D (depth)=4 B (breadth), then $r$ (radius)

=.114 D. 2. When D=2 B, then $r$ =.23 D. 3. When D=B, then $r$ =.35 D. 4. When D=$\frac{1}{2}$ B, then $r$ = .54 D. 5. When D=$\frac{1}{3}$ B, then $r$ =.63 D. 6. When D=$\frac{1}{4}$B, then $r$ =.70 D.

Taking the fourth of these propositions where the depth is one-half of the breadth, and constructing a section with the ascertained radius, the area divided by the boundary gives a result expressed by .531 D. When we make the section a simple semicircle, the area divided by the boundary gives only .5 D, showing that in the proportion of surface to area, there is a gain of about six per cent in the section above described over a semi-circular section. The gain is still greater over sections formed by ogee curves of great concavity, such as are sometimes employed on vessels. That cross section which gives the greatest ratio of its area to its boundary is entitled to be called "the section of least resistance." It follows from this also that of two steamers, equal in displacement and capacity, with engines of the same power, and equally well modeled as to water-lines, the one will excel in speed whose sections are constructed with the radius of bilge as found according to the method set forth in the paper of Mr. Napier. These results of pure mathematical science are not chimeras, for they have been applied with unprecedented success in the construction of several steamers in Glasgow, and they must ere long come into general application. They furnish another illustration of the value of pure science in promoting the progress of the useful arts. Mechanical ingenuity, however great it may be, cannot dispense with the deductions of science, but must employ them in attaining the highest results.

## LITERARY NOTICES.

THE AMERICAN ANNUAL CYCLOPÆDIA. D. Appleton & Co., 443 Broadway, New York.

The value of a volume which includes all the prominent events of the day, and which sums up in a compendious form the principle occurrences of the year, is almost incalculable. Such a work is the "American Annual Cyclopædia," and the utility of the publication for ready reference for all classes in the community, whether lay or professional, cannot be over-estimated. Under their appropriate headings, political, civil, military, and social affairs receive attention; and the amount of information conveyed in the biographies and obituaries, notices of distinguished men, in commercial and scientific statistics, is such as to render the "Cyclopædia" an absolute necessity to every one who desires to keep pace with the spirit of the age. The individual who could carry even a brief synopsis of the events described in the book would unquestionably be considered a well-read man. The article entitled "Army Operations" contains full and copious notes on the physical aspect of the war, the attitudes of the two sections of the country, and the causes which led to the disagreement still, unhappily, existing. This portion of the "Cyclopædia" occupies no less than one hundred and forty-eight of its pages, and its importance justifies the space bestowed upon it. Many a lavishly-praised history of the war is ushered into existence without possessing a tithe of the merit of this excellent digest. Mr. Samuel Colt's invention, the revolving pistol, which made his name so famous, is also noticed; and the narration of the early struggles of the inventor and his subsequent success forms one of the most interesting pages in the work. Under the caption "Confederate States" we notice a thorough investigation into and register of the important events which transpired in that section of the country during 1862, and the financial and executive departments of the pseudo-government, so far as known from published accounts, are detailed at length. The British Industrial Exhibition has also a large space allotted to it, and the wonders of the mechanical, artistic, and scientific world claim the reader's attention and interest. We consider the "Cyclopædia" one of the most valuable books issued from the press this year, and shall have frequent occasion to refer to its columns. It is pleasant to notice the fidelity with which the minute incidents and every-day occurrences connected with the particular subject in the "Cyclopædia" are reproduced and retained. They serve to add a zest and flavor of energy and spirit to the volume, without which it would be as flat and unprofitable as soda-water without carbonic acid gas. The "American Annual Cyclopædia" is a book that cannot be dispensed with; and we welcome it as a valuable addition to our library.

THE ATLANTIC MONTHLY. Ticknor & Fields, Boston, Mass.

Almost with the regularity which attends the issue of a daily newspaper, this standard magazine appears monthly upon our table, and the volume for July is replete with interest. The leading article, "The Doings of the Sunbeam," is a careful review of the photographic establishment of Messrs. E. H. and T. Anthony, the widely-known artists of this city, and gives the reader a very clear insight into the details of the several processes there carried on. "The Wraith of Odin," a poem; "Gala Days," by Gail Hamilton; "Paul Blecker," (concluded); "The Growth of Continents," a continuation of Professor Agassiz's interesting series on subjects of a kindred nature; "English Naval Power and English Colonies; and many other articles in prose and verse which we are unable to classify for want of space. The story of "Paul Blecker" is written with such strength and intensity of purpose and feeling, that the reader is impressed with the idea that it must be a life-history; and the interest in the narrative—so we may call it not inaptly—ceases only with the closing line. Out of all the fire and trial that hedges about the principal characters of the tale—out of the heat of passion there springs a lesson of purity which is an earnest and vital aid to those who lean to virtue's side but are tempted from it by circumstances, that is as refreshing as it is sound and healthy. One reads Miss Dodge's "Gala Days" with a feeling very much akin to that curtly expressed by Sir Charles Grandison in reference to bores:—"I never know what they are going to say next." "Gala Days" is a dashing, rattling, voluble narrative of events, and the charm of recounting them seems never to weary or pall upon the writer. Several glaring inconsistencies were noticed by us, as in that line where the authoress apologizes for using the barbarism "lets up" and then confesses to "kicking" her husband, and defiantly defends the phrase and the act as though she were conscious of its inelegance but *would* have her own wilful way. "Our General" is a record of General Butler's career in New Orleans, and is an interesting review of events occurring during that period. No one who wishes to keep pace with the current literature of the day should fail to read the "Atlantic."

THE SCALPEL. Edward H. Dixon, editor. Published by Everardus Warner, No. 1 Astor House, New York.

Although this publication is professedly a periodical devoted to the elucidation of knotty theoretical points in medical science and practice, yet there are many pages on which popular subjects are treated in a terse, vigorous and to-the-point style that claims the attention of the reader and invites his criticism. The present issue (No. 3 of Vol. XII) contains, among other articles, one upon the evils of "diploma-shops" or "doctor-factories" as they are sometimes called. This article has too much truth in it to be slighted by the general reader, and we think that, in connection with the theme, a little attention might be profitably bestowed on some unworthy representatives of the surgical art who follow the army and saw off the legs and arms of soldiers. The operations in many cases ought not to be performed, and when done is oftentimes mere brutal butchery. Charles Reade, the celebrated English author, in his new novel, is engaged in a scathing raid upon pretenders to medical science in London, and will doubtless succeed in opening the eyes of the doctor-ridden public to the enormity of their sufferings. The "Scalpel" is the pioneer in this much-needed reform at home.

THE PRACTICAL SHEPHERD. Published by J. B. Lippincott & Co., Philadelphia, and D. D. T. Moore, Rochester, N. Y.

A new work on sheep-husbandry entitled "The Practical Shepherd," is about to be issued; it is edited by the Hon. Henry S. Randall, LL.D., author of "Sheep-Husbandry in the South," &c. Mr. Randall is well known to be the most reliable writer on sheep-husbandry in the country; and the new work is intended to be standard authority upon all questions relating to sheep, such as descriptions of the various breeds, their management, breeding, diseases and remedies, &c. The information obtained by its author has been derived from thirty-five years' personal experience with large flocks, together with a knowledge of different systems, received from a very extensive correspondence with leading flock-masters in every part of the world. The book will be a manual to which every farmer can refer when he wishes to ascertain any fact connected with the management of sheep.

### Composition and Properties of Coal Gas.

Gas made from cannel coal consists of olefiant gas, associated rich hydro-carbons, and light carbureted hydrogen. These give to gas its illuminating properties, especially the two first; the latter giving but little light It also contains hydrogen, carbonic oxide and nitrogen. The first two burn with a strong white light, and constitute the light-giving constituents of gas. Although this is the case, this is but a small proportion of the complex mixture of coal gas. The light carbureted hydrogen forms from thirty to forty per cent. of coal gas; it burns with a yellowish flame and gives but little light. The hydrogen and carbonic oxide compose the remaining gas. They give no light on combustion but a faint blue flame. The light carbureted hydrogen and carbonic oxide may be regarded as mere diluents of the two first. Dry gas made from cannel coal and freed from carbonic acid contains the following proportions:—

| | Per Cent. |
|---|---|
| Olefiant gas and associated hydro-carbons | 9·21 |
| Oxygen | 0·16 |
| Nitrogen | 5·37 |
| Light carbureted hydrogen | 38·08 |
| Hydrogen | 42·33 |
| Carbonic oxide | 4·84 |
| | 99·99 |

### Gas from Anthracite Coal.

At a recent meeting of the Board of Councilmen of this city, the following resolution was offered by the president:—

*Resolved*, That there be and is hereby granted to the Anthracite Gas-Lighting and Heating Company, of New York, permission to lay pipes and mains for conducting gas, for illuminating and heating, and for other purposes, through the streets, avenues, lanes, and other public places in the city of New York, for a period of fifty years, as provided by the general manufacturing laws of the State of New York; the same conductors to be laid under the supervision of the Street Commissioner, the said company being required to restore the streets opened by them for laying such pipes to the same condition as before the said pipes or mains were laid.

Which was referred to the Committee on Finance.

This is a singular resolution relating to a preposterous project, judging from the name of the company. Illuminating gas cannot be produced from anthracite coal.

A GREAT SALT DEPOSIT.—It appears from scientific investigation that the salt deposit at New Iberia, Louisiana, is of the most extensive and wonderful description. For vastness and purity it is unequaled on the globe. One account says:—"Imagine, if you can, the granite quarry of Massachusetts or the marble quarry of Vermont to be solid deposits of pure rock salt, clean and transparent as so much clear white ice, in one solid, inexhaustible mass, underlying the earth, and you then acquire an imperfect idea of the vastness of this salt formation."

IRON CLAD LADIES.—The last new thing in the way of dress ornamentation is leather. The Princess Metternich made her appearance lately in a dress of Havana-colored silk, ornamented with leather trimmings, studded with steel-headed nails. The bonnet was of the same material, ornamented in a like manner, and, strange to say, so was the parasol. Similar ornaments are the rage among ladies in this city. They make the fair wearers look as if they were iron-clad.

ARRIVAL OF COTTON AT NEW ORLEANS.—During the week ending May 22, there were received at New Orleans 2,492 bales of cotton, principally from the country which has just been opened by General Banks. In the four days following—that is to say to May 26—1,340 more bales came to hand. This made altogether a stock on hand and on ship-board of 7,150 bales, with a prospect of much more to come at once.

### Income Tax Law.—Important Decisions.

The Commissioner of Internal Revenue has made the following decisions in relation to the Income Tax :—

The Income Tax must be assessed and paid in the district in which the assessed person resides. The place where a person votes, or is entitled to vote, is deemed his residence. When not a voter, the place where tax on personal property is paid is held to be the place of residence.

In cases of limited partnerships, formed with the condition that no dividend or division of profits shall be made until the expiration of the partnership, each member of such firm will be required to return his share of the profits arising from such business, for the year 1862, as, had they so desired, a division of the profits could have been made.

Gains or profits realized from the sale of property during the year 1862, which property was purchased before the Excise Law went into effect, should be returned as income for the year 1862.

The executors or administrators of the estates of persons who died in the year 1862, should make return of the income thereof for the year 1862.

A merchant's return of income should cover the business of the year 1862, excluding previous years. Uncollected accounts must be estimated.

Physicians and lawyers should include actual receipts for services rendered in 1862, together with an estimate of unrealized or contingent income due to that year.

Dividends and interests payable in 1862 should be returned as income for that year, no matter when declared.

Dividends derived from gas stock are taxable as income.

Income derived from coal mines must be returned, although a tax has been previously paid on the coal produced. No deduction can be made because of the diminished value, actual or supposed, of the coal vein or bed, by the process of mining. Rent derived from coal mines is income.

Premiums paid for life insurance shall not be allowed as a deduction in statement of income.

Pensions received from the United States Government must be returned with other income subject to taxation.

Old debts formerly considered hopelessly lost, but paid within the time covered by the return of income, should be included in this statement.

Debts considered hopelessly lost, but paid on the 31st of December, 1862, and due to the business of the year 1862, may be deducted from the business; if subsequently paid, they must be included in the return for the year in which paid.

In order to give full effect to the proviso to the 91st section of the Act of July 1, 1862, respecting the tax on that portion of income derived from United States Securities, it is directed that when income is derived partly from these and partly from other sources, the $600 allowance made by law shall be deducted, as far as possible, from that portion of income derived from other sources, and subject to three per cent tax.

No deduction can be allowed from the taxable income of a merchant for compensation paid for the services of a minor son.

A farmer, when making return of the total amount of his "farm produce," shall be allowed to deduct therefrom the subsistence of horses, mules, oxen, and cattle used exclusively in the carrying-on of said farm. The term "farm produce" is construed to include all productions of a farm, of what nature or kind soever.

The account of stocks sold by a farmer since Dec. 31, 1862, should not be included in the present assessment, but the profit realized thereby must be accounted for in his next year's return. Where he has included in his return produce raised by him, and fed in whole or part to stock subsequently sold, he must account for the gain realized by feeding and selling of said stock. Where he has not included the produce so fed, he must return, as profits, the difference between the value of said stock on the 21st of December, 1861, and the amount realized for them.

Fertilizers purchased by farmers, to maintain their land in present productive condition, will be considered as "repairs" in estimating income.

Interest should be considered as income only when paid, unless it is collectable and remains unpaid by the consent or agreement of the creditor.

Losses incurred in the prosecution of business are a fair offset to gains derived from business, but not from those portions of income derived from fixed investments, such as bonds, mortgages, rents, and the like.

Property used in business, and furnishing profits, when destroyed by fire may be restored at the expense of those profits, to the condition when destroyed; if insured, the difference between insurance received and amount expended in restoration will be allowed.

The increased value given a new building by permanent improvements will be charged to capital—not income.

The contingent fund of manufacturing corporations, made up during the year 1862, and not distributed, should not be returned as part of the income of the stockholders.

The undistributed earnings of a corporation, made previous to Sept. 1, 1862, whether the corporation is required to pay tax on dividends or not, should not be considered as the income of the stockholders, nor should the corporation be required to make return of said reserved earnings as trustees, under section 93 of the Excise Law.

The income of literary, scientific, or other charitable institutions, in the hands of trustees or others, is not subject to income tax.

### Curious Assertions for Historical Societies and Financiers to prove or disprove.

There are in the United States more men and estates that can be assessed for one million dollars each than there were at the close of the Revolution that could be assessed for ten thousand dollars each.

The cash value of the property of the United States (excluding the States in rebellion), is one hundred times what it was in all the States at the close of the Revolution.

The gold and silver in the United States is one hundred to one at the close of the Revolution.

Joint stock companies—bank, insurance, railroad, steamboat, manufacturing, &c.—are as one thousand to one at the close of the Revolution.

The annual product of gold and silver that enters into and braces our currency and credit is as five hundred to one at the close of the Revolution.

Our commerce, inland and foreign, is as five hundred to one at the close of the Revolution.

A Spanish quarter-dollar was of more importance in the eyes of the people then than a double eagle is now.

The country, as the basis for borrowing and paying, is more than one hundred times greater than at the close of the Revolution. Where, then, is the point in likening our Government currency and securities to Continental money?

Old and first-class nations are able to sustain immense debts—see England and France—while new and minor nations are classed as of doubtful future, and shunned by money lenders.

We are now a first-class nation. At the close of the Revolution we were the youngest and smallest of all nations.

The power to sustain a debt is as the cube of the base on which the debt rests. This holds good with national, corporate, and individual payers.

A trader with a thousand dollars capital is hardly considered trustworthy for any balance on account. A merchant with a million capital is trusted with any number of other millions.

A bank of small capital is hardly considered safe to send a moderate collection to; whereas a two million bank is considered a safe depository for twelve or fifteen millions, all payable on demand.

With nations the same parallel holds good. This country can better sustain a debt of two thousand millions now, than it could one of a hundred thousand at the time of Continental money.—*Thompson's Bank Note Reporter.*

Professor Whitney, the State Geologist of California, found among the Sierra Nevadas, about 200 feet above the level of the ocean, an almost perfect jaw of a rhinoceros. Huge petrified oyster-shells were also found among the mountains of the interior and at a great elevation.

### A New Solvent for Silk.

The London *Photographic News* states that M. J. Persoz, the distinguished Parisian chemist, has discovered a new solvent for silk, and it is believed that a solution of silk will prove to be useful in photography as a substitute for collodion. This agent is also valuable to distinguish the nature of tissues, such as fabrics mixed with silk, cotton and wool. While it dissolves silk it does not act thus upon woolen and vegetable fiber. To different learned bodies samples of wool and silk tissues have been exhibited, a portion of which has been dipped in cloride of zinc. The silk was all dissolved out whilst the wool was left intact. The solvent employed by M. Persoz is chloride of zinc concentrated to about 60° of the areometer. This is to be boiled with excess of oxide of zinc until it becomes sensibly neutral to litmus paper. It is in this state a basic chloride; when distilled water is added to it, it does indeed become slightly turbid, but the solution has the advantage of causing no alteration in vegetable tissues which may have to be isolated in the course of the experiment. If excess of free hydrochloric acid be present it might dissolve cellulose, as this acid has been found to exercise a strong solvent power on vegetable fiber. On contact with the chloride of zinc, prepared as above described, the silk is converted into a gummy mass, preserving at first the form of the threads of the tissue, but changing gradually to transparent clots, and finally becoming completely dissolved. In fact the process of solution is very similar to that of dissolving gun-cotton in alcoholized ether. Chloride of zinc of the above strength gradually dissolves a considerable quantity of silk at the ordinary temperature; but under the influence of heat the solution is effected in a few instants, becoming viscous and capable of being drawn into threads like a thick sirup. It then resembles a strong solution of gum arabic. Ammonia produces in this solution, after dilution with water, a white precipitate which dissolves completely in an excess of reagent. Many chemical means have been tried to separate the silk from the chloride zinc used as a solvent; but after once being obtained in solution it resisted all attempts to separate it until the beautiful dialytic method of Professor Graham was tried. The silk solution was first diluted by pouring it into water accidulated with hydro-chloric acid. In a former experiment the solution, having been twice filtered without getting rid of its slightly opalescent appearance, was placed on the dialyser. A large quantity of chloride of zinc passed directly, and after a few hours the liquid became much more viscid. It then increased in volume and became an opaline, jelly-like starch. This jelly contained yet a little chloride of zinc which could not be separated. In succeeding experiments by diluting the solution with more water before submitting it to the action of the dialyser, and especially by heating it for a few minutes, all the chloride of zinc was separated and a limpid, colorless and tasteless liquid obtained, being a pure, aqueous solution of silk. This by evaporation gives a gold-colored friable varnish.

### Death of a Distinguished Citizen.

The Hon. Ezra Lincoln died at Boston, on the 15th of June, of an apoplectic fit. Mr. Lincoln had enjoyed the confidence of his fellow-citizens for many years, having filled several high offices within the gift of the people. He was at one time postmaster of Boston, and at the time of his death was assistant United States Treasurer. He was also widely known as a successful patent solicitor and attorney. He was also intimately connected with the late Hon. Benjamin Lincoln, also of Boston, and descended from a family widely known for their talent. Mr. Lincoln's death was very sudden, and is deplored by a large number of his fellow-citizens.

The Idler.—Everything within us and about us shows that it never was intended that man should be idle. Our own health and comfort and the welfare and happiness of those around us, all require that man should labor. Mind, body, soul, all alike suffer and rust out by idleness; the idler is a source of mental and moral offense to everybody around. He is a nuisance in the world and needs abatement for the public good, like any other source of pestilence.

### OBSCURE SOURCES OF DISEASE.

Under the above heading, Dr. James R. Nichols has communicated a very important article to the Boston *Medical and Surgical Journal*, extracts of which we give as follows :—

"There are many instances of disease, brought to the notice of physicians, which are exceedingly perplexing in their character, and the sources of which are very imperfectly understood. I am led to believe that a considerable number arise from some disturbance in the sanitary conditions of dwellings or their surroundings, and that however improbable this may seem from a superficial or even careful examination of suspected premises, a still more thorough and extended search will often result in the discovery of some agent or agents capable of producing disease.

"The chemical and physical condition of water used for culinary purposes has much to do with health, and is perhaps the oftenest overlooked by the physician in searching for the cause of sickness. We must not suppose that water is only hurtful when impregnated with the salts of lead or other metals; there are different sources of contamination, which produce the most serious disturbance upon the system. Some of these are very obscure and difficult of detection. The senses of taste and smell are not to be relied upon in examinations, as it often happens that water entirely unfit for use is devoid of all physical appearances calculated to awaken suspicion. It is clear, inodorous, palatable, and there is no apparent source from whence impurity may arise.

"During the past summer, the writer was consulted by a gentleman residing in Roxbury, respecting the water used in his family. It was taken into the dwelling through tin pipe from a well in the immediate vicinity, and appeared to be perfectly pure and healthful. Analysis disclosed no salts of lead or copper, as indeed none could be expected from the unusual precautions taken to prevent contact of the water with these metals. Abundant evidence was, however, afforded that, through some avenue, organic matters in unusual quantities were finding access to the water. Careful examination of the premises disclosed the fact that an outhouse on the grounds of a neighbor was so situated as to act as a receptacle for house drainings, and from thence by subterranean passages the liquids flowed into the well. Some cases of illness, of long standing in the family, disappeared upon abandoning the use of the water.

"A few months since a specimen of water was brought to me for chemical examination, by a gentleman of Charlestown, who stated that his wife was afflicted with protracted illness of a somewhat unusual character. It was found to be largely impregnated with potash and the salts resulting from the decomposition of animal and vegetable *debris;* and the opinion was expressed that a connection existed between the well and the waste fluids of the dwelling. This seemed improbable, as they were all securely carried away in a brick-cemented drain, and in a direction opposite the water-supply. The use of the spade, however, revealed a break in the drain at a point favorable for an inflowing into the well, and hence the source of the contamination. Rapid convalescence followed on the part of the sick wife upon obtaining water from another source.

"Analysis was recently made of water from a well in Middlesex county, which disclosed conditions quite similar to these. The owner was certain that no impurity could arise from sources suggested, but rigid and persistent investigation disclosed the fact that the servant girl had long been in the habit of emptying the "slops" into a cavity by the kitchen door (formed by the displacement of several bricks in the pavement), where they were readily absorbed. Although the well was quite remote, the intervening space was filled with coarse sand and rubble stones, and hence the unclean liquids found an easy passage to the water. This proved to be the cause of illness in the family.

"In cities and large towns, where excrementious matters accumulate rapidly around dwellings compacted together, it is difficult to locate wells remote from danger, and hence it might seem that suspicion should be confined to those localities. This, however, is not a safe conclusion. How often do we see, upon isolated farms in the country, the well located within or upon the margin of the barnyard, near huge manure heaps, reeking with ammoniacal and other gases, the prolific sources of soluble salts, which find access to the water and render it unfit as a beverage for man and beast. It may no doubt be a convenience to the farmer to have his water-supply so situated as to meet the wants of the occupants of his barn and dwelling, but it is full of danger.

"Whilst admitting that such may be the condition of the water of many wells, doubts may arise with some, whether substances not decidedly poisonous, and received in such quantities, can, after all, be productive of much harm, or the real source of illness. To the great majority of people they are certainly harmless, but it must be admitted that there is a class, and one or more are found in almost every family, whose peculiarly sensitive organization does not admit of the presence of any extraneous agent in food or drink, or in what they inhale. The functions of life and health are disturbed by the slightest deviation from the usual or normal condition of things around them.

"It seems incredible that the thousandth part of a grain of one of the salts of lead, dissolved in water and taken daily, will disturb the system of any one; and yet such is the case. We can see no reason why a very little nitrate of potassa, or soda, or lime, taken in the same way, should produce any effects; still stranger is it that the infinitesimal amount of dust dislodged from painted wall-papers, received into the lungs, should make inroads upon health.

"Several instances of this latter result have recently come to my knowledge. In two families of the highest respectability in this city, illness of an unusual and protracted character existed, and at the suggestion of the physician, portions of the green wall-paper of the dwellings were submitted to me for analysis. The pigments were found to consist mainly of arseniate of copper, and upon the removal of the papers the illness disappeared. In experimenting with apparently the most suitable apparatus, and employing delicate chemical tests, in rooms the walls of which were covered with those arsenical papers, no evidence of the presence of the poison in the atmosphere has been afforded; and this corresponds with the results of all similar experiments made in this country and in Europe, so far as my knowledge extends. We must conclude that agents not recognizable by chemical tests are capable of disturbing vital processes. The evidence is very clear that in instances of illness confined to one or two members of a household, the cause may be due to some accidental disturbance with which all are equally brought in contact, but which has the power of injuriously injuring only a part. It is also clear that these sources of disease are of such a character as easily to escape detection, and therefore any facts or experience which may serve as guides to their discovery are worthy of record."

### Shoemaking by Machinery.

The employment of machinery in the manufacture of boots and shoes is of but recent date, but it has effected a wonderful revolution in this important industrial art. On this subject the Lynn (Mass.) *Reporter* says :—

"Comparatively few people are aware of the quiet but steady revolution that is going on in the business of shoemaking, and particularly as that business is conducted in Lynn. Previous to the introduction of the original sewing machines, which are now universally used for the binding and stitching of the uppers, but little or no improvement or even change had been made in the manufacture of shoes. The awl, the bristle and thread, the lapstone and hammer, with plenty of 'elbow-grease,' were, as they had been for years, the main appliance of the shoemakers, and little was known or thought of labor-saving machinery. After a time, women's nimble fingers were found inadequate to the demand, and sewing machines soon transformed the old-fashioned "shoe-binders" into a new and more expansive class of "machine girls" whose capacity for labor was only limited by the capabilities of the machines over which they presided. Iron and steel came to the aid of wearied fingers and weakened eyes. This was the beginning of the new era, which is destined to produce results big with lasting benefit to our flourishing city.

"It is scarcely ten years since the first introduction of machinery of any kind into the manufacture of shoes in this city. Everything was done by hand, even to the cutting-out of the soles, which was a slow process and required the expenditure of a large amount of physical force. The introduction of sole-cutting and stripping machines, although sparingly, was the first indication that a change was to take place in the business of shoemaking; but no one, even ten years ago, would dare to have prophesied that the change was to be so immediate and so great. The rapid progress that has been made during that time, and especially within the past year or two, in the introduction of machinery in shoemaking has been beyond all previous calculation. It may almost be said that hand-work has already become the exception, and machinery the rule. The little shoemaker's shop and the shoemaker's bench are passing rapidly away, soon to be known no more among us; and the immense factory, with its laboring steam-engine and its busy hum of whirling wheels, is rising up in their place, to change the whole face of things in this ancient and honored metropolis of the 'workers in the gentle craft of leather.'

"The problem as to how best to bring in and concentrate the vast army of men and women employed in the shoe manufacture of Lynn is one that has attracted the attention of many thinking minds among our business men, but it has never been satisfactorily solved until now. Machinery, and particularly the sewing machine, has done in a few short months what years of theorizing and speculation could not do. It has demonstrated that the factory system can be successfully and profitably introduced into the shoe business; in fact, that, with the rapid strides which the business has made within a few years, it is the only system that can be made available for its successful application in future. Of course, the new system is yet in its infancy—the business is yet in a transition state; but the wheels of revolution are moving rapidly, and they never move backward. Operatives are pouring in as fast as room can be made for them; buildings for 'shoe factories' are going up in every direction; the hum of machinery is heard on every hand; old things are passing away, and all things are becoming new. Could the disembodied spirits of some of our old-time inhabitants visit the scenes of earth once more, how great would be their astonishment at the change which has taken and is taking place in this once quiet town which claimed them as citizens!"

### Attempt to sound the River Niagara.

The gentleman who has been trying the experiment of sounding the river Niagara below the Falls writes as follows:—"Another attempt was made with a similar iron of about 10 pounds weight, attached to a No. 11 wire, all freely suspended, so as not to impede the fall of the weight. I then let the weight fall from the bridge, at the height of 225 feet. It struck the surface fairly, with the point down, must have sunk to some depth, but was not longer out of sight than one second, when it made its appearance again on the surface, about one hundred feet down the stream, and skipped along like a chip until it was checked by the wire. We then commenced hauling in slowly, which made the iron bounce like a ball, when a cake of ice struck it and ended the sport. I am satisfied that no metal has sufficient specific gravity to pierce that current, even with a momentum of 225 feet. The velocity of the iron when striking must have been equal to 124 feet per second, and consequently its momentum was 5,000 pounds. Its surface exposed to the current was about 50 superficial inches. This will give an idea of the strength of that current, and at the same time a hint at the Titan forces that have been at work to scoop out the bed of the Niagara river."

It is stated that the British Government have finally determined to purchase the International Exhibition building for national uses, connected with the extension of artistic and scientific knowledge.

The *Journal de Bruxelles* publishes a letter describing the discovery, at Blankenberghe, of a fossil man eight feet in length, found in a layer of antediluvian peat, and supposed to be 6,000 years old.

## LIQUID CARBURETING OF COAL GAS.

When coal gas or air is passed through a volatile liquid hydro-carbon, such as naphtha or benzole, it absorbs some of the liquid which passes off as vapor, and it then burns with a more brilliant flame. What was called Paine's water gas consisted in passing the hydrogen of decomposed water through naphtha, a mixture of alcohol and turpentine, or benzole. Mace's benzole light consisted of air passed through benzole. That coal gas or air would take up a portion of naphtha, when passed through it, was well known thirty years ago, as at that period Charles Mansfield, of Manchester, England,—the discoverer and first patentee of various coal-tar oils—proposed to naphthalize common air and employ it for illumination. Since then it has been proposed several times by persons in various parts of the world, and within the past year the subject of naphthalizing the coal gas used in London has been revived, and an apparatus for carrying out the system has been applied to several of the street lamps. A large number of patents have also been taken out in England lately for modifications of the apparatus in applying the naphtha to coal gas. One granted to R. A. Brooman, of London, is described as follows;—"This apparatus for carbureting gas consists of a vessel for containing the carbureting liquid, and of a carburator fitted to the first-named vessel. The reservoir is placed above the carburator, and is independent of it, so that it can be removed for the supply of fresh liquid. It consists of a vessel with an aperture at the top for the introduction of the liquid, and which aperture is hermetically sealed by a stopper. The reservoir communicates at bottom with the carburator by means of a tube, the mouth of which is covered with metallic cloth to filter the liquid as it flows out. The carburator, which is supplied from the reservoir, is divided into three compartments, each of which forms a small vessel. These vessels are fitted with cotton wicks extending vertically the whole depth, or nearly so, of the apparatus. The gas, after having passed through a tap of peculiar construction, reaches the carburator through a pipe, and descends by another pipe to the lower part, where, after having traversed the three compartments fitted with wicks, it becomes enriched, and issues from the apparatus by another pipe to the burner." In this case cold naphtha is distributed over an extensive surface, and the gas thus vaporizes it more freely. Another patent granted recently to W. R. Bowdich, of Wakefield, Yorkshire, England, embraces the feature of heating the naphtha to vaporize it, after which it passes through a pipe in the apparatus and mixes with the coal gas. The nature of the invention is described in the patent to consist "in applying heat to vaporize and keep vaporous the hydro-carbons employed for carbureting or naphthalizing gas for illumination, and in passing gas, before it is burned, through or over the heated hydro-carbons; also in heating the hydro-carbons, and keeping the volatile products hot by the gas flame itself, and in improved apparatus."

All these attempts to improve the system of gas-lighting appear to be unscientific and objectionable. In every case where heat is applied to vaporize the naphtha for mixing with the gas, the vaporizing vessel must be placed near the burner, as heavy hydro-carbons condense easily and will obstruct the flow of gas; in such an instance it is essentially the combination of a small retort with every gas-burner. And in the case of using the naphtha cold to enrich the gas, this is essentially the combination of a liquid naphtha lamp with a gas-burner. Such devices and apparatus are complicated, troublesome, and expensive; the employment of refined petroleum alone in street lamps would be less objectionable. The cleanliness and convenience of coal gas constitute its leading merits, and it appears to be absurd to seek to improve its illuminating qualities by liquid hydro-carbons, through the agencies of lamp arrangements. Common coal gas may be enriched by employing superior material for the manufacture. The agent in the gas which produces illuminating results is olefiant gas, which abounds in greater abundance in oil, resin, and some cannel coals than in common Liverpool coal. The gas made from the Scotch Torbane hill coal, for example, possesses double the illuminating powers of that made from English coal; and there is about as great a difference in the quality of some American gas coals. The best and most simple method of enriching coal gas is to employ that material for manufacturing it which yields the greatest amount of olefiant gas.

### Curious Customs of some Barbarians respecting Diet.

If we turn to the natives of Greenland, we shall find their carnivorous habits tending almost exclusively to animal substances. Their dishes are, however, generally such as are not likely to be excessively provocative to any but Northern palates; their greatest delicacy being, in many cases, part of a whale's tail, rendered soft and easy of digestion by being half putrid, or perhaps a seal's carcass in the same delicious state. Among other delectable dainties, they sometimes present the flesh of bears, sharks, gulls, &c. The poorer class subsist on even a coarser bill of fare, they being compelled to satisfy the cravings of their omnivorous stomachs with whatever kind of food they can find; even from the flesh of their foes down to those delicate zoological specimens which they may discover on each other's heads. In times of scarcity they wander to the coast and avail themselves of sea-weed, which, of course, they find sufficiently saline without the addition of salt. The Laplanders live upon the reindeer and bear, their ordinary libation being whale-oil, or water in which juniper berries have been infused. It is a well-known peculiarity of countries which lie within or near the Arctic circle, that the inhabitants require four or five times as much food as those of temperate climates. At Nova Zembla, from the greater activity and vigor of the digestive organs, Europeans are obliged to follow the example of the natives by drinking the blood of the reindeer and eating raw flesh: the intense cold removing that disgust which such doses among other people would naturally inspire among other people. To inhabitants of warm countries, temperance, or even occasional abstinence, is therefore no very difficult virtue; Northern nations, on the contrary, being voracious from instinct and necessity, to keep the requisite quantum of caloric. The wandering Calmuc Tartars also eat the flesh of horses, wild asses, and other animals, often in a raw state. The Chinese, on the other hand, are famous for the richness and variety of their entertainments, although some of their viands are somewhat novel and curious. An account of one of these is thus given by Captain Laplace, who attended one of their feasts:—"The first course was laid out in a great number of saucers, and consisted of various relishes in a cold state, among which were salted earthworms, prepared and dried, but so cut up that I fortunately did not know what they were until I had swallowed them; smoked fish and ham, both of them cut up into extremely small slices; besides which, there was what they call Japan leather, a sort of darkish skin, hard and tough, with a strong and far from agreeable taste, and which seemed to have been macerated for some time in water. All these dishes, without exception, swam in soup. On one side figured pigeons' eggs cooked in gravy, together with duck and fowl cut very small, and immersed in a dark-colored sauce; on the other, little balls made of sharks' fins, pounded shrimps, and maggots of an immense size." Among the subordinate classes of the Celestials the feeding is almost as indiscriminate as among Northern savages; cats, dogs, and such like delicacies being regarded as first-rate; a drowned rat is also deemed a dainty dish. The Siamese are still less scrupulous in their tastes; they devour, without distinction, rats, mice, serpents, putrified fish, and all sorts of garbage. It is said those refined gourmands, the Parisians, also indulge strange fancies for dog's meat, delicately fricasseed; and, according to a celebrated satirist, we are informed that "when cats is in," the street pieman drives a great trade. The most disgusting of all recitals yet remains; it is too horrible, however, to dilate upon in this place—we refer to the practice of cannibalism. In the island of Sumatra, for instance, as well as among other savages, the prisoner of war is doomed to become the living repast of his wretched captors, and is literally eaten piecemeal. As an extreme contrast to the carnivorous tribes, we may mention the Brahmins of India, who religiously abstain from every kind of animal food, and even think it a crime to destroy gnats or other vermin by which they are annoyed. In Persia very little animal food is eaten, vegetable diet being almost universally preferred. The inhabitant of Australia, again, is characterized by his carnivorous propensity for kangaroos, opossums, various sorts of insects, eggs of a large species of snake, and wild honey. The Caffres, in common with those savages already referred to, are in the habit of devouring various kinds of reptiles, such as large caterpillars, from which butterflies and moths are produced, also white ants, grasshoppers, snakes, and spiders; they also indulge in more substantial meals of buffalo beef, and the flesh of even the lion. Our neighbors of Mexico are said to be, like the French, very partial to frogs; the banana, however, forms a principal article of food with them, also the cassava, which is extremely nutritive; but the flesh of monkeys is with the Mexicans, as well as the inhabitants of some of the West India islands, very generally used, since they have a good supply of that genus in their forests. This *penchant* seems but one remove from absolute cannabalism, since, when this animal is divested of his skin, it precisely resembles a human being. There are some of the tribes of our Indians who are fond of rattlesnakes, which they boil or stew. The anaconda and other boas afford a wholesome diet to the natives of the countries they inhabit. Crocodiles and lizards are eaten in South America and the Bahama isles. The sloth is also a common article of diet there, which is said to resemble in flavor that of boiled mutton. The tapir and the armadillo are eaten by the Brazilians and West Indians. Even in some parts of civilized Europe the inhabitants use as food many substances, the very mention of which would cause disgust and abhorrence to our more refined palates. In Denmark and Sweden horse-flesh is publicly exposed for sale in the markets. In early times there seems to have been less scrupulous nicety in the choice of dishes in France, Italy and Rome, when the inhabitants had stomachs so brave as to digest even vipers, snails, toads, frogs; the latter, indeed, are not even excluded from the culinary preparations of the modern Parisians. We have not yet finished our catalogue of the rarer delicacies of mankind. There are the geophagists, or earth-eaters, and such as subsist on the bark of trees. Incredible as it may seem, the digestive functions of man, in his rudest state, are even capable of deriving nutriment from the mineral kingdom. In New Guinea, and elsewhere, these abominable earth-eaters are to be found. We learn from Humboldt that the Ottomaques, on the banks of the Meta and the Orinoco, feed on a fat, unctuous earth, or a species of pipeclay, tinged with a little oxide of iron. They collect this clay very carefully, distinguishing it by the taste; they knead it into balls of four or five inches in diameter, which they bake slightly before a slow fire. Whole stacks of such provisions are seen piled up in their huts. These balls are soaked in water when about to be used, and each individual eats about a pound of the material every day. The only addition which they make to this unnatural fare consists of small fish, lizards, and fern roots. In Java, Russia, and Germany, this product of "mountain meal" is also resorted to as an element of food.

### To prevent "Pitting" in Small-pox.

The application consists of a solution of india-rubber in chloroform, which is painted over the face and neck when the eruption has become fully developed. When the chloroform has evaporated, which it very readily does, there is left a thin elastic film of india-rubber over the face. This the patient feels to be rather comfortable than otherwise, inasmuch as the disagreeable itchiness, so generally complained of, is almost entirely removed, and, what is more important, "pitting," once so common, and even now far from rare, is thoroughly prevented wherever the solution has been applied. It may be as well to state that india-rubber is far from being very soluble in chloroform; so that, in making the solution, the india-rubber must be cut into small pieces, and chloroform added till it is dissolved.

[The above is from the Edinburgh *Scotsman*, and the efficacy of the application is said to be of no doubtful character.—Eds.

It is said that our postal currency is circulating freely as change in the rebel capital.

## Correspondence

**The Cincinnati Water-Works—The Engineer's Report.**

MESSRS. EDITORS:—Permit me to suggest that the conclusion arrived at by the chief engineer of the Cincinnati Water-Works, as to the policy of using large steam pipes for pumping engines (as stated in an extract from his report in a recent number of your paper), is scarcely warranted by the facts instanced. It is doubtless true, that with an excess of thirty pounds pressure in the boilers over that used in the cylinder, the necessary supply of steam for even a higher rate of motion than is used in some pumping engines may be forced through a smaller pipe than is sometimes used. The question arises whether a greater loss of heat would not occur by radiation from the use of pipes of the ordinary size, or from the increased temperature of the boilers due to so great an excess of pressure over that required to drive the engine? If it is claimed that the boilers are so covered as in a great measure to prevent the evil referred to, it is true on the other hand that the pipes may be covered with equally good effect, without reference to their size. I submit that a true solution of the question lies in the employment of a variable cut-off, by which the large steam passages are useful in maintaining a pressure in the cylinder as nearly as possible equal to that in the boilers, thus gaining a higher rate of expansion and a proportional economy. I am aware that the utility of a high rate of expansion is questioned, but I have seen pumping engines cutting off at one-third of the stroke, but running at so low a rate of speed as to lose the benefit of it; the whole moving weight being lifted against the force of gravity; it required 7.3 lbs. of coal per horse-power per hour. I have also seen apparently reliable accounts of Cornish engines in which a rate of expansion as high as one-twelfth is used (and the essential condition of speed attended to) that gave a horse-power for 1 3 lbs. of coal per hour. I am not informed as to the consumption of coal by pumping engines in this country, but my impression is that few of them approach the figures of the best English engines. Some I know do not, and I attribute the fact to a want of faith in the principles of arithmetic.

S. H. WILDER.

Central City, Colorado Territory, May 28, 1863.

[The utility of a cut-off depends very materially upon the circumstances under which it is applied. If the cylinder is too small the cut-off is only a useless incumbrance, and if the boiler is also deficient the cut-off is equally unnecessary. A great many errors have been made in this respect, and have caused the principle of working steam expansively to fall into disrepute, simply because the most obvious precautions to insure success were neglected. It is impossible to get something out of nothing, and we think our correspondent places the figures relating to the consumption of coal per horse-power per hour very wide apart. The first amount is too great and the second too small. If he had said that the consumption of coal in our best engines amounted to between 3.75 pounds and four pounds an hour per horse-power, he would have been nearer the mean. Our correspondent is doubtless aware that we print many communications that we do not indorse. Every person is entitled to a fair expression of his views when they are based on common sense, and we endeavor to follow this principle in conducting our paper.—EDS.

**Power Machines for Domestic Uses.**

MESSRS. EDITORS:—I beg leave to fully endorse the sentiments of F. N. Blackman, published on page 390, Vol. VIII (new series) of the SCIENTIFIC AMERICAN. The assertions of "John Smith" are all rubbish, as every mechanic must know; and I was a little surprised at their finding place in the SCIENTIFIC AMERICAN, as the conclusions of its editors are generally sound. I hardly think with Mr. Blackman, however, that a small, cheap steam-engine is the desideratum to be sought as a domestic power. I have at different times thought much on this matter when I have seen the women worn down and exhausted by a hard day's washing, and the conclusion I have come to is that a *horse power* is the best power for domestic purposes. I believe the thing to be sought after is a cheap, simple horse-power, and I think inventors of such machinery would do well to advertise it in the SCIENTIFIC AMERICAN. There is one point of the question I cannot omit, and that is that I have discovered by experience that the more machinery there is about a house, the more plague there is to the men. All machinery requires more or less attention, and occasional "fixing"; and the women are not good at such work. Every now and then it is: "John, I wish you would look at that sewing machine"; or "John, that wringer has something wrong about it;" and so on. Well, the only way to meet that is to buy the very best machinery; you will then have little trouble. Some churls may say: "I won't buy so-and-so; what else have the women got to do? Let them work!" All I have to say to such is that I have no sympathy with them. I hate to see the women of the family borne down with the fatigue of severe labor; and if it is a little troublesome to fix machinery for them, I for one am content to endure that trouble.

JOHN GRAY.

Dundas, C. W., June 18, 1863.

[Our correspondent's views are sensible on this point, and we think that the overtaxed farmers' wives and country women generally will feel obliged to him for espousing their cause. The communication from "John Smith" which has excited so much comment was inserted by us as a simple act of justice to an inventor, and for no other reason. We are not responsible for his opinions, and we wish it to be understood by all interested that we cannot defend mistakes or want of judgment on the part of our correspondents. We give all of them a chance to be heard, but our duty ends with that privilege.—EDS.

**The "Scientific American" as a "Life-Preserver."**

MESSRS. EDITORS:—On Saturday, June 6th, at the depot in this place, while the regular noon train was standing in readiness to depart for Covington, the "Kenton," a beautiful locomotive engine, exploded her boiler with terrific violence, killing some eight or ten United States troops and wounding fifteen or twenty others. The engine was almost a total wreck, the report was loud and the concussion very great. Some of the fragments were picked up a mile distant from the scene of the disaster. At the time of the explosion there were two trains standing side by side, the opposite train was loaded with troops and was partly demolished. The fireman, seeing the engineer standing on the opposite side of the track, stepped off the engine to speak to him, but just at that moment the "Kenton" exploded. Scarcely half a minute after the fireman left his engine, he stated that he just tried the water and had two cocks and 115 pounds of steam; 130 pounds being the regular pressure. In consequence of this disaster the engineer was terribly censured and assailed by the excited crowd; to save his person from violence he was placed in close confinement. At this critical juncture I had with me two numbers of the SCIENTIFIC AMERICAN, that I had borrowed from one of your subscribers, containing some very useful and important information upon the subject of boiler explosions, the theory of boiling water, &c. I introduced the numbers to the notice of the mob, and they had a good effect, and were instrumental in delivering the engineer from his bondage. The numbers were dated March 28, and April 18, 1863.

D. C. SHELY.

Nicholasville, Ky., June 9, 1863.

[We think that engineer should thank his lucky stars that he got off so easily. Explosions will occur in the best regulated engines; but it is rather unfortunate for those in charge of the engine at the time, that a mob of illiterate men should undertake to decide questions which puzzle the scientific world. —EDS.

RUTTAN'S VENTILATED CARS.—One of Ruttan's ventilating cars has been placed on the Philadelphia, Wilmington, and Delaware Railroad. We understand that thirty new cars, ventilated upon the Ruttan principle, have been ordered for through trains to run between New York and Washington when the junction railroad is completed.

**Capture of a Rebel Iron-clad.**

he *Atlanta*, formerly the *Fingal*, a rebel iron-clad, was recently captured by the *Weehawken* while trying to run out to sea from Savannah. A short action of thirty minutes sufficed to put an end to her fighting, and she was then surrendered by her crew. Probably those on board have a very different idea of the powers and prowess of our iron-clads from that which they entertained previous to the engagement. The following are the dimensions, &c., of the *Atlanta*:—Her length over all is 180 feet; breadth, 40 feet; draft of vessel, 16 feet; height of smokepipe, 12 feet; she has engines of of 300 horse power; her pilot-house is five feet square, with six inches of wood-backing, and five inches of iron plate; her deck, forward and aft, is plated with iron two and a-half inches thick; her armament consists of four of the Brooke rifles; her ram is 6 feet long by 3 feet wide; her roof, which slopes at an angle of 30 degrees, is 20 inches thick—15 inches wood covered with two layers of 2½ inch plates; her plating is all 2½ inches thick by 5 inches wide; the holes in her pilot-house are 1 inch in diameter; she has four water-tight compartments: her pilot-house and smokepipe are square; her forward and after guns train to starboard and port; in the lower layer of her plating is an alternate layer of pine wood.

The *Weehawken* fired but five shots at the *Atlanta* when she succumbed. The first shot from the *Weehawken's* fifteen-inch gun, fired by Captain Rogers himself, took off the top of the pilot-house and wounded all the persons therein. The *Atlanta* was converted into an iron-clad by the rebels, and had sloping sides at an angle of 30 degrees similar to the *Merrimac's;* they were fifteen inches thick, plated with five-inch iron. There was also a saw and a torpedo attached to the ram at the bow which was intended for blowing up the *Monitors*. The armament of the *Atlanta* consisted of four guns, two seven-inch rifles, and two six-inch of the same class; there were a large quantity of stores on board, showing that the *Atlanta* had prepared herself for a long cruise. Her career was brought to an untimely end. The fifteen-inch guns, in this case at least, have done some service to the country, and shown that the powers attributed to them by the inventor were not over-estimated. We have it from indisputable authority that at a recent trial in Washington the fifteen-inch shot penetrated a wooden target four feet thick, faced with six inches of iron, with a charge of forty pounds. Recent experiments with this formidable gun shows that their qualities have been underrated, and that the charges can be increased very materially. This discovery will be hailed with gratification by the people, but we think that it should have been made long ago.

**Naval Triumphs.**

After a long period of apparent ill luck our naval commanders have recently obtained signal advantages over the enemy. The iron steamer *Calypso*, a notorious anglo-rebel blockade-runner, was captured by the United States steamer *Florida* after an exciting chase of four hours and a half. The *Calypso* is 250 feet long and 30 feet beam, and is a steamer of great speed; she is fore-and-aft rigged; her cargo consisted of dry goods and liquors; no arms were found on board of her. The vessel was owned by a club of 24 Charlestonians; her cost is stated to be only $25,000, a very low figure, probably intended for $250,000; she has given the blockading fleet a great deal of trouble hitherto. She will probably be turned into a blockader herself, to assist in capturing some of her coadjutors, after being condemned in a prize court. Captain Black, who commanded her, is a desperate character; while being chased by the *Florida* he endeavored to destroy the ship when he found that he had no chance of escape. He cut the feed-pipe and let water into the ship until there was four feet of it in the hold; he also endeavored to burst the boiler but without success. During the chase the engine of the *Calypso* was disabled by the breaking of the connecting rod.

Another blockade-runner was sunk on the 5th ult. by the fleet off Charleston; she is supposed to have been the *Isaac Smith*. Still another rebel craft, said to be the much vaunted blockade-runner *Beauregard*, was run ashore and set on fire off Folly Island, in Charleston harbor, on the night of the 10th ult.

## HONDURAS AND ITS RESOURCES.

The wealth of Central America and the States adjacent to it seems to be but limitedly appreciated by the world at large. The popular idea respecting that region is that the inhabitants are negroes or Spanish Indians; that reptiles of all kinds abound; that filth and fever are ubiquitous; and that plantains, oranges, and other tropical fruits may be had for the picking. That the foregoing features have some existence is not to be denied; but the other and more valuable ones—the soil, the climate, and the mineral wealth of Honduras—are persistently lost sight of. Few of the Anglo-Saxon race have settled there, and yet, if we may believe modern travelers, Meagher, Squiers, and others, there is no more delightful country on the globe than that lying between the Tropics of Cancer and Capricorn, in the longitude 10° 20′ west from Washington. A recent letter from San Pedro, Honduras, thus speaks of the inexhaustible wealth of that region, vegetable and mineral:—

"A few days ago there passed, on their way to Minas de Oro, in the department of Comazagua, six Americans, three of whom are from the town of Binghamton, N. Y. These men are going to prospect those mines and the country from there to the river Sulaco, and thence to the department of Olancho, to try their luck in the celebrated gold-bearing rivers of that department. The mines known by the name of Minas de Oro are old abandoned mines, having been worked extensively by the Spaniards previous to the independence of the Central American States, which will be in September coming forty-two years. The traditions of the natives concerning them are that they are very rich, and that several *empresarios* left them for Old Spain very rich; but be this as it may, they are situated in the heart of a rich mineral country, containing mines of gold in quartz and surface-diggings, silver mines in profusion, copper and iron, with an abundance of medicinal minerals.

"Having been in Oregon and Washington Territories, and in the northern and southern mines of California, also having seen the greater portion of the State of Honduras, I have been able to compare the superficial appearance of those different States satisfactorily to myself, prospecting the earth and some of the rivers, and seeing the prospects taken out by the natives while at work, and the gold offered by them for sale. The gold and silver mines of this State are upon the coast range of mountains, and their extending spurs, covering a base of a hundred and thirty to a hundred and fifty miles—that is to say, from Minas de Oro in the south, to gold-bearing quartz in the vicinity of San Pedro, upon the Atlantic side of the state, north.

"The gold diggings of Olancho connect on the east with the extensive silver mines of Santa Maria, in this State, and the mines of Depilto, in the department of Segovia, in Nicaragua. I have been over the mines of Santa Maria. They are of quartz, sulphurets of silver, and rich lead ores; some of the lead ores yielding, from a rough assay, from four to five ounces to the arroba of twenty-five pounds. There is in a river near to Santa Maria rich lead ore, detached by time and the action of the atmosphere, sufficient for a thousand men to work for one year.

"Again, south and west, comes the gold-bearing earth of the river Sulaco. Further on, in the same direction, are the mines of Minas de Oro; and away in the extreme south, within half a day's travel of the Pacific Ocean, are the rich mines of Guasucarau and the Tabanca mines, in the State of San Salvador, now extensively worked by a French company. Still further west comes the gold-bearing earth of Santa Cruz, in the department of Santa Barbara. Next is Quimistan, near to which is the celebrated gold-bearing gulch called Quebrada Guayaba, containing coarse gold. A little south of this is the river Tiquitapa, from which the natives are constantly washing gold; also the river Chiquila, which, in my opinion, contains more gold than any in Honduras.

"Honduras contains many other things besides mines, and some that would perhaps pay as well, if not better. Among those are cotton, tobacco, sugar, rice, cacao and coffee. The natives only plant cotton sufficient to make pillows for their beds and candle-wick. They simply cut off the brush and burn it, plant and clean it once, and it yields abundantly, not only for one year, but for three and four years in succession. The people of the United States will soon have an opportunity of judging as to the quality of the cotton, as there is a small quantity in Omoa at the present time ready for shipment, the natives having been induced, from the high price of the article, to bring some from the interior. Tobacco grows well, very large and fine in the leaf, yielding a second crop, which is used here to make cigarettes.

"Sugar grows as it does in no other part of the world, bearing successively for fifteen years without replanting. Rice grows luxuriantly all over the State; it never requires irrigation, growing equally well upon hill-sides and mountains as it does in the valleys. Cacao and coffee grow all over the State, the cacao growing better in the valleys, and the coffee upon the high ground. God in his bountiful goodness has done everything for the country, so that it requires but little or no labor to live, and the negro race, having but very little ambition, raise no more than is sufficient to live upon and to clothe them; therefore those in this country of the Spanish race wish for a white population. Here we have perpetual summer. It is very easy to raise two crops of corn, and you can raise three crops in thirteen months upon the Atlantic side, this being the side of the State nearest to New York; two crops of beans, and sweet potatoes all the year. Plantains and bananas grow all over. So does yuca, from which arrowroot is made; and the cassava, a fine vegetable—bulbous root. The country abounds in wild fruit of many kinds. Deer and wild hogs are plenty in the woods, and it is the greatest country in the world for raising chickens, the hens laying all the year round. The climate is good.

"I have just remembered that one of the persons who have gone to Minas de Oro told me that it was generally believed in the United States that this country was and is very unhealthy. I cannot understand how such an impression has gone abroad, for it is not so. I have lived in this country for three years, and during that time I have traveled over a thousand leagues in the interior, riding all day in the hot sun, and perhaps sleeping at night out on the savannah or mountain, as the case may be, and the natives do the same generally during the summer months, preferring to sleep out of doors when it is very warm. The manner of living of the people brings on fever in nine cases out of ten. Only imagine: they eat large quantities of meat, which is always cooked in hog's fat. Beans are a common dish. They first boil them and then fry them in fat; the beans must swim in lard to be good; with the beans they eat cheese—cheese of the country—that is made in the following manner:—The milk is taken from the cows and poured into a large wooden vessel. They use rennet in abundance, putting in an immense quantity of salt, so much so that you can taste nothing but salt. I have often thought if I was President for one week, I would put such a duty on salt as would stop this practice. Now, as the milk is warm from the cow, the rennet is not sufficient to make it thick, so they always have a large quantity of lemons on hand, the juice of which they use, to make it turn sour, I suppose. Well, this makes the cheese. Now, such cheese as this, as hard as a brick, but mixed with beans, cooked as I have stated, the natives eat liberally—for they have good appetites—perhaps three times a day. Would men in any temperate part of the world eat such a mess as this and not have fever? All that is necessary to do here, to have good health and retain it, is, to be temperate in all things, keep the system free from bile, and bathe often."

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EXTRAORDINARY ENDURANCE.—Paul Bartlett is employed as a laborer at Tyndall Iron Works, Durham, England, and has been a teetotaler fourteen years. His employment consists in wheeling iron to the furnaces. He works 9 hours per day, and 5 days per week. He wheels twenty-four tuns of iron each day, four hundred weight at a time. The distance traversed is nearly nine miles per day. He thus walks 45 miles per week of five days, wheeling at the same time 120 tuns of iron. During the fourteen years Paul has driven his barrow, with its four hundred weight of iron, not less than 630 miles, and has wheeled in the same time 87,360 tuns. He can, on a "pinch," place one tun weight on his barrow, and wheel it several yards.

### American Goods in Australia.

The following extract is from a letter of a correspondent of the Boston *Evening Traveler*, in Melbourne, Australia. He says:—"Still the starry banner floats over the nation's representative here; still the beautiful ships of our republic enter these waters, laden with the products of American skill. In direct competition with the boasted tools and implements of England many articles of iron and wood supersede here the use of English-made. The American cook-stove is a miracle of convenience; the American axe and shovel, the American carriage, the American miners' boots, and many other articles carry away the palm. An American with his machine shows how best to crush the rock, and how best (before slates arrived) to cover the roofs, and how best to open up a stage-coach communication with the vast interior. The men of the starry flag are here, active, intelligent, bold, liberal. They are not numerous, but they know how to be respected. This is no doubt the oldest of the continents. Its living forms seem yet in transition to the types elsewhere—its flora more allied to that of the ancient coal formations. There is here no horse, no deer, no cat, no dog (unless one or two of doubtful kind), nor any of the great mammalia. Marsupials, mostly of the strange, kangaroo type among animals, and curious evergreens and fern and palm-like trees among the flora, with no native berries and fruits (or very nearly none)—such are some of the obvious appearances in living forms; while scarcely any great rivers or lakes penetrating and beautifying the country are to be found."

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### What Desecration!

Messrs. Ayer & Co. have received from Alexandria a cargo of rags to pay for their medicines. They are evidently gathered from all classes and quarters of the Pacha's dominions—the cast-off garments of Hadjis and Howadjis—white linen turbans, loose breeches, and flowing robes. Not the least part of their bulk is cloth in which bodies were embalmed and wound for preservation three thousand years ago! They are now to be made into paper for Ayer's almanacs; and thus, after having wrapped the dead for thirty centuries, are used to warn the living from the narrow house which they have so long inhabited. —*Exchange.*

[Shades of Isis and Osiris to the rescue! Will you suffer the despoiler to disturb your subjects' manes without in some way visiting him with your displeasure? And you, oh, Sphinx! and Memnon, and the sacred bull Apis—open your lips of stone and hurl fierce wrath and denunciation at those who unroll the bandages from your kings and who, perhaps, remove the swaddling garment from Cleopatra herself, to furnish material for a Yankee pill-vender's almanac.—EDS.

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### Baltimore and Ohio Railroad.

We learn from the report of the master of machinery—Thatcher Perkins—of the above-named railroad, that the number of locomotives employed upon it during the month of April last, was 172, the average number of miles run by each engine 2,282, miles run to one cord of wood 1,211, miles run to one quart of oil 22.9, pounds of coal consumed per mile run 61.8, cost of repairs per mile run 5c., cost of fuel per mile run 4c., cost of stores per mile run 1.2c., total cost 10.2 cents per mile. The total number of miles run by the passenger engines was 392,659, and by freight engines 307,117 miles.

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THE CULTIVATION OF ROSES.—The rose requires abundance of air and light, and judicious grouping is indispensable. This may be accomplished by forming a rose pyramid, rising gradually in hight from the minutest dwarf at the base to the tallest standard at the apex. As the varieties are almost endless it would be impossible to enumerate them. Every florist's catalogue will supply the list, and the taste of the operator direct the arrangement. A proper discrimination should of course be manifested with regard to the time and continuance of blooming, so as to secure the finest possible effect.

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THE lighting of Paris by electricity, it is stated, is to be entrusted to M. J. Van Malderan, who has invented an electric light, one jet of which is equal to 2,200 jets of gas.

### Improved Spring Bed.

The above engraving represents an improved mode of constructing spring beds, for which Letters Patent were granted to Warren P. Miller, of Marysville, Cal., on June 9, 1863.

These beds are composed of conical spiral springs placed between longitudinal slats, and attached to vertical bars traversing through holes in the slats. On the top of each bar is a cap or button, upon which the mattress rests. The springs are but four inches apart from centers; there being about five times the number usually employed. They are comparatively light, interpose but slight resistance to pressure, and, as their action is independent one of the other, they readily adopt a position corresponding to the person. Two persons of unequal weight may occupy these beds without inconvenience to either, nor do they sink away in the center and form the sleeper into a segment of a circle.

In point of economy, ease, and durability these beds are unsurpassed. One ordinary mattress is sufficient to make a superior bed. They are so constructed as to preclude the possibility of getting out of order, and it is confidently asserted that they will last fifty years. All that is claimed for these beds will be readily conceded by an observer, and they need only to be used to be appreciated. Patented through the Scientific American Patent Agency. For further information address G. & E. H. Parish, Hinsdale, Mass.

MILLER'S PATENT SPRING BED.

### NORTHERN COTTON CULTIVATION.

Although cotton has become scarce and high in price, from circumstances well known to all, and although flax and wool have taken its place, and perhaps will maintain their position in many classes of goods for which cotton was formerly used, still it is of such a peculiar character, that no other known fiber can supplant it for many purposes. The operations involved in its preparation for spinning are all of a mechanical nature and are executed with machinery. It has not to be retted and treated chemically like flax, and it does not require to be soaped and oiled like wool. Its preparation is therefore more simple and economical. Taken from the field, it but requires to be run through the gin and the picker, and is then fit for the carder. And it is so soft and pliable that it may be made into fabrics that have surfaces soft as the down of the swan, and also into lace thread, attenuated as the spider's web. Its cultivation, we understand, is becoming extended in localities where it was not formerly thought of, as a crop, and no doubt it may be cultivated in districts where it has been supposed it would never reach maturity. The very finest qualities of cotton are undoubtedly raised in warm latitudes near the tropics, but in China and Japan very good short staple is raised in latitudes as far north as Long Island, and these oriental varieties in all likelihood could be acclimated here. Our consuls in China and Japan should be instructed to forward seeds from their respective localities, with descriptions of the modes pursued in their cultivation. The greater number of fibrous materials which can be raised at home render us more independent of foreign supplies, and tend to increase our industrial resources.

LARGE POWDER MILLS.—The Union Powder Works in New Durham, N. H., turns out two tuns of powder per day for the Government. These works, with three other larger establishments, furnish a large portion of the powder used in this war. The Dupont Works, Wilmington, Del.; Hazard, in Connecticut; Oriental, in Maine; and the Union, in New Hampshire, have turned out at the rate of 400 barrels per day.

### "Highfalutin."

Dr. Oliver Wendell Holmes, in the course of an interesting article on the photographic art, delivers himself of the following astounding paragraph:—

"Then we replace the slide in the shield, draw this out of the camera, and carry it back into the shadowy realm where Cocytus flows in black nitrate of silver and Acheron stagnates in the pool of hyposulphite, and invisible ghosts, trooping down from the world of day, cross a Styx of dissolved sulphate of iron, and appear before the Rhadamanthus of that lurid Hades."

The English of this is that the photographer brings out the features printed on the plate by washing it with sulphate of iron and hyposulphite of soda.

### SCOTT'S PATENT STAMP-CANCELER.

The creation of an internal revenue tax, and the adoption of stamps by which to legalize the various documents in use in business transactions, has demanded the introduction of machinery; in order to guard against fraud each stamp must be effectually canceled after it has been used, so that there can be no possibility of its being affixed a second time to any other paper. The press herewith illustrated accomplishes this object by the following arrangement. The light cast-iron frame is supported by the bed-plate, A, and has on its upper end a polished table, B; this table has a raised boss under the knives, C, four in number, and is covered with leather to prevent them from being dulled. The knives are set in the shoulder of the rod, D, which works through the cylinder, E, of the arm, F. There is a spiral spring in this cylinder, so that by placing a document on the raised boss, and striking or pressing forcibly down on the button-head, the stamp is separated into four pieces and cannot be removed whole. This attachment of the press is intended for single stamps, but when necessary to cancel a large number at once, it can be done by turning the handle seen at one side; this is keyed on a shaft which carries a pinion working in the large spur wheel, G. The cam, H, runs on the friction roller, I, in the knife-head, and forces the latter down. When the cam has passed, the spindle carrying the knives flies up again and allows the papers to be withdrawn. This constitutes a power press, and is capable of exerting a great strain. The leather-covered portion may be seen very clearly on the lower part of the machine under the knives. This machine is very strongly made, and will very fully accomplish the object for which it was designed. It was patented on April 1, 1862, by Edwin M. Scott, of Auburn, N. Y.; further particulars can be had by addressing Swasey, Fosgate & Co., at that place.


### Fast Running.

The Hudson river steamer *Mary Powell*, Captain A. L. Anderson, made the run between this city and Poughkeepsie lately, in three hours and forty-two minutes. Leaving here at half-past three o'clock, P. M., she reached the latter city at twelve minutes past seven o'clock. Deducting thirty-five minutes consumed at landings and five minutes lost on getting into the stream on starting, and the actual running time for the seventy-five miles is three hours and two minutes—a feat unprecedented in the annals of Hudson-river steamboating.

[The steamer *City of Buffalo*, formerly running upon Lake Erie, has run 75 miles in three hours and six minutes frequently. The distance from Toledo to Buffalo is said to be 300 miles by the course run; the time between these two ports, of the boat above-mentioned, was equal to a speed of 22 miles an hour for fourteen consecutive hours. We think that is pretty fast steamboating.—EDS.

### Lumber shipped from Philadelphia to Maine, &c.

The Philadelphia *Press* says that one firm in that city has furnished to various ports in the State of Maine the lumber necessary to complete, within the past two years, at least forty ships, of which four were United States gunboats. During the past year the following amounts of oak and pine timber were furnished by one house to the ports named:—To Bath, Maine, 523,640 feet; to Thomaston, Maine, 325,000 feet; to Searsport and Freeport, Maine, 327,099 feet; to Richmond, Maine, 278,138 feet; to Yarmouth, Maine, 241,899 feet; to other Maine ports, 500,774; to ports of Massachusetts, 67,200 feet. Total, 2,263,750 feet.

THE prospects of the peach crop in New Jersey are said to be uncommonly promising. The backward spring delayed somewhat the budding of the trees and thus prevented the liability to blight.

AN anvil block, weighing 100 tuns, was cast at Sheffield recently. This is by far the largest casting ever made in England.

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NEW YORK, SATURDAY, JULY 4, 1863.


## OUR NEW VOLUME.

Eighteen years ago the SCIENTIFIC AMERICAN was commenced under the belief that such a publication was desirable and would be beneficial to our mechanics and artisans. Since then twenty-two volumes of it have been issued, and this number is the first of the twenty-third, or the ninth volume of the new series. It was commenced under many adverse circumstances, but it has been successful beyond anticipation, and has advanced from a weekly journal of four pages to one of sixteen. In a very enlarged sense it has been educational in its influence. The notices, descriptions and illustrations of new inventions and discoveries which have been presented through its columns have stimulated the inventive genius of our country, resulting in an increase of improvements in mechanism and manufactures without a parallel in history.

Although the past two years have been checkered with scenes of violence, excitement and change, the circulation of the SCIENTIFIC AMERICAN has continued large, and the last volume has never been surpassed for beauty and amplitude of illustrations. We commence this volume with the continued determination to keep our readers fully advised of all that is occurring in science, invention and the practical arts. Critical discussions, timely suggestions, useful receipts and notices of discoveries at home and abroad, will be furnished as usual, and every effort will be made to render our new volume superior, if possible, to any of its predecessors.

The publication of such a journal involves a great expense, and demands severe labor, extended information and careful research; therefore, to enable us to conduct it, we require the generous support of a large number of subscribers. Hitherto this has been given with a heartiness which has rendered our labors and efforts pleasant and encouraging. We rely upon our readers for a continuance of their patronage, and an exercise of their influence among friends to extend its circulation. No inventor or mechanic manufacturer can keep pace with the improvements of the day unless he consults its columns. The subscription for it has been usually held by its readers to be among their most profitable and satisfactory investments.

## AGRICULTURAL MACHINES.

The benefits which have been conferred upon our farmers and our whole people by improved agricultural machines cannot be computed by mere dollars and cents. In conversation, a few days since, with a most intelligent Western farmer he told us that manual labor was so scarce in the country last autumn, that but for horse-rakes, mowers and reaping machines, one half of the crops would have been left standing on the fields. This year the demand for reapers has been so great that manufacturers will not be able to fill all their orders. Farming is comparatively "child's play" to what it was twenty years ago, before mowing, reaping and other agricultural machines were employed. The severe manual toil of mowing, raking, pitching and cradling is now performed by machinery operated by horse-power, and man simply oversees the operations and conducts them with intelligence.

## STEAM FOR AGRICULTURAL PURPOSES.

The application of steam to the business of farming has not been as general in this country as we could wish. Neither, from present appearances, are we very sanguine that it will become popular. We are at a loss to account for this very general indifference of our farmers on what would seem a matter of vital importance. In some of the rocky and sterile regions of the Northern States there are doubtless good reasons against the adoption of steam plows and cultivators of all kinds, yet in the Western States, and on the fertile prairies, and rich alluvial bottoms of the Mississippi valley, where the undulations of the surface are slight, it is a matter of astonishment that the advantages of steam are so persistently lost sight of.

In England this subject has received more consideration, for, as a foreign journal justly remarks, "steam cultivation means good wages and cheap, because abundant, food. It is a question of putting more into the earth and taking more out of it. It is a question of greatly increasing the corn-producing power of the land; of more live stock and cheaper meat. Yet it is calculated that, up to the present time, the steam power applied to agriculture does not exceed 50,000 horse-power." That is in the United Kingdom, as we understand it, and in relation to the last assertion we venture to remark that not the fiftieth part of that power is in use in this country for the purpose alluded to. We cannot point to a single part of the Northern States where land is cultivated or worked by steam. What is the reason therefor? Are steam plows required? Agriculturists have only to mention such a want to have it supplied by the ready wits and talent of our inventors. We fear that our farmers are not sufficiently enterprising and alive to the advantages likely to accrue from a substitution of the all-powerful steam for the laborious and tedious process of breaking land by the old methods; and it is a matter for no little regret that there should be 50,000 horse-power at work on farms in Great Britain, while we have not a tithe of that amount. It is estimated that one horse will devour daily the food of seven men; we have, therefore, only to calculate the number of horses employed in farm work to ascertain the amount of grain that might be turned into the markets of the world instead of into horse-flesh. All the steam plows that could stand between here and the Rocky Mountains would not consume the sustenance of a babe, and the land now devoted to oats might be given to wheat, to the general and indeed certain advancement of the interests of the community.

It may be urged against the adoption of steam power that it is costly, and beyond the reach of men of ordinary fortune. We think this objection can be fully met and overcome by the organization of local interests, so that a machine would be the joint stock property of farmers in the vicinity. The same plan is now pursued very generally in the case of mowers, reapers, and other costly tools, and the principle could well be adopted in this case. A company has been formed for this purpose in Great Britain, and it now lets out steam cultivators to farmers at a nominal sum, allowing the user to pay a certain amount annually until he has purchased it. In this way the farmer becomes the owner of a valuable apparatus which he may be said to have bought out of itself, or rather with the profits he gained in its use.

We cannot say how such a plan would work in this country, but it would be for the interest of those manufacturing such machinery to try and introduce the system. Induce farmers to use portable engines for hauling gang-plows, or for elevating hay with the power-forks now so generally in use. The engines could stand in one corner of a field and by means of a long rope and pulleys add materially to the effectiveness of the apparatus. So also with stump-pulling; a small portable steam engine would be just as manageable and for more effective than all the tugging and straining at levers, winches, or whatever the mechanical power through which force is transmitted to the obstinate roots or to the unwieldy hay. Steam cultivation offers a profitable field for research to inventors and manufacturers. Sooner or later all the work of the world must be done by steam, as much of it already is; and it is no argument to say that the means to apply it are not at hand. Agriculturists have only to make their wants known, and, our word for it, there will be enough steam plows produced to till the whole surface of the globe every hour in the day.

## AMERICAN SILK MANUFACTURES.

Next to food, the clothing of a people is the most important physical consideration, especially in changeable climates subject to severe cold. Hitherto fabrics composed of cotton, wool, silk and flax—pure and mixed—have formed the staple of our clothing, and for these the annual expense incurred has been prodigious. Woolen and cotton cloths have been manufactured upon an extensive scale at home for many years, but thus far the silk and linen cloth used have been imported from abroad. The value of imported silk goods has ranged from twenty to twenty-five millions of dollars annually for several years past; that of flax from five to seven millions. The present civil war, though an undesirable evil, appears to evolve some good results in the establishment of new manufactures among us. The high tariff and advanced rate of exchange have been operating to produce such results. Some qualities of silk cloth are now being manufactured, for the first time, competing successfully with similar styles imported from France. We lately examined several pieces of silk manufactured by Cheney & Brothers, at Hartford, Conn., and used by Walker & Penman, Leonard street, this city, for making trimmings of ladies dresses, and we consider these new products valuable acquisitions to our textile manufactures. They are woven in power looms, and the day is not far distant, we think, when we shall be manufacturing various qualities of silks equal in every respect to those produced in the looms of Lyons. We thus judge because in the same factory at Hartford, pongee handkerchiefs and sewing silk have been manufactured for several years, and the latter surpasses in quality the best that is made in Europe. It is preferred for use on sewing machines on account of its strength, uniformity of twist, and beauty of finish. Printed as well as plain dyed silk pieces are made at the above establishment, and the demand for these fabrics is fully greater than can be conveniently supplied at present. Great convenience has been experienced by several of our merchants in obtaining desirable colors of this class of goods to meet immediate demands, instead of having to forward orders to France. We conclude that silk cloth has now become one of our home staple manufactures.

Several years ago, the cultivation of the mulberry tree, for the purpose of raising silk, was entered upon by thousands of our people under a feverish excitement which raged for one or two seasons. It was one of those speculative manias which occasionally inflict communities with day-dreams of prospective wealth, ending with gloomy disappointment. This was not because silk cannot be raised in almost every section of our country, but because it could not be raised as a raw material to be sent to France, and compete successfully with the cheap raw silk of China and Southern Europe. But as we have now the prospect of a home market for raw silk, this beautiful product may yet be cultivated in our country with fairer hopes of profitable success. The subject is at least worthy of renewed consideration and further experiment.

## PECULIARITIES OF PETROLEUM BENZINE.

When petroleum is distilled at a low temperature a light limpid liquid is obtained which has received the name of benzine. It is different in its chemical properties from the benzole of distilled coal-tar naphtha, and is about as volatile as an ether—its density being 0·715. It boils at a temperature between 140° and 150° Fah., and it has now become a valuable article in the arts, being used extensively as a substitute for turpentine in mixing paints, and it is also employed for the removal of grease, &c., from light kid gloves, silks and woolen fabrics. It dissoves india-rubber, asphaltum, some resins, tallow, fatty oils, paraffine, stearic acid and wax, but it is not a powerful solvent of amber, copal or shellac. Iodine dissolves in it, producing a red color; bromine is dissolved in it with a slight explosion, and

a gas is disengaged which burns with a beautiful green color. Nitric oxide gas passed into the benzine gives it a fine green color; when ligh ted the flame of the gas has a broad green coat and a purple center. Hydrogen gas passed over the surface of benzine burns with a flame emitting considerable light. The petrol-benzine cannot be mixed with water nor with wood naphtha, but readily and to any extent with absolute alcohol, oil of turpentine and bisulphide of carbon. In common ether it produces a turbidity, caused probably by a per-centage of water. Sulphur and phosphorus dissolve only in small quantities in it.

## FLAX DRESSING.

The attention of a large portion of the agricultural and manufacturing community is at this time turned towards the production and treatment of flax; the former endeavoring to produce it in sufficient quantities to answer the demand, and the latter, in connection with the inventor, seeking to put it in the market at such prices that it can at once be obtained by all classes. Very little difficulty has been experienced in growing flax, but insurmountable obstacles have attended the dressing of the straw as economically as is demanded. Many flax-breaking machines have been invented, but few of them, however, have been found desirable in all respects. We are gratified to observe that one—the Mallory & Sanford machine—performs its work with a thoroughness that augurs well for its popularity and adaptability to the end desired.

Most persons are aware that flax is nothing but a series of fibers concealed in a wooden case or stem, and that, in order to liberate the flax, the shoove or wooden part must be removed, and this without injuring the quality or character of the staple. Although an apparent simple and easy duty, to the superficial observer, it is in reality a very serious task and has had an amount of ingenuity expended upon it that seems surprising, unless the character of the work be considered. The machine that we have alluded to performed its work very handsomely, and makes not a particle of tow. We were informed, and can readily believe, that the proprietors cannot keep pace with the demand for their machine.

We allude to this machine in the belief that it is destined to work a revolution in the art of dressing flax; and that in view of the manifold interests springing from the successful treatment of flax fiber, it behooves all interested in its manufacture to adopt every means which promise a successful prosecution of their labors. For printers and publishers generally the benefits likely to ensue from a supply of flax stock to the paper-maker, in lieu of cotton, are not to be over-estimated, both as regards the better quality of the paper and the reduced cost at which it is believed it can be afforded. Also, for belting, warp for carpets, felting, calicoes, &c., the adoption of flax for cotton, which is now rendered feasible, promises to inaugurate a new era which will be hailed by all who desire to be independent of a stringency of cotton occasioned by any cause whatever. The whole Western country teems with flax straw which has hitherto been burned or thrown into rivers, after being deprived of its seed, for want of flax machinery to reduce it to a condition fit to be worked, the seed alone paying for the cost of raising. This machine (an engraving of which and testimonials from those who have used it are presented on another page of the present number) is not exclusively a power machine, but is made of a suitable size to work by hand, so that any farmer owning but an acre or two of land can dress his little crop with the utmost celerity. Hand machines are provided, which accomplish in a proportionate degree all that the more ponderous power machines can. The actual value of such a machine to the growing demands of society, for linen clothing, housekeeping and the arts in general, is very great, and we expect to see linen in our markets rivaling in quality that of Ireland and at much lower prices.

Wheat for a Barrel of Flour.—The question is often asked, how much wheat does it take to make a barrel of flour? At the annual fair of the Dubuque County Agricultural Society, in 1860, James Pratt & Co., of the Rockdale Mills, entered one barrel of winter and one of spring wheat, accompanied with the statement that sixteen bushels of winter wheat yielded three barrels and 108 pounds of flour—at the rate of four bushels and fifteen of wheat to the barrel. Of spring wheat, fifty bushels yielded eleven barrels of flour, being four bushels and thirty-two pounds per barrel. The wheat used was of a fair quality, and no more.

## THE MECHANIC ARTS AND THE FINE ARTS.

Shortly after the death of President Taylor we spent an evening with the celebrated painter, Vanderlyn, and the Commissioner of Patents at the house of a mutual friend in Washington. A portrait of the deceased President, by Vanderlyn, had just been disposed of, by raffle. After expatiating awhile on "art and high art" and giving incidents connected with the production of Vanderlyn's famous pictures of Marius, Ariadne, the landing of Columbus, &c., the conversation slid into an amusing debate on the relative importance of the mechanic arts and fine arts, and the social standard of their professors. Vanderlyn was insulted at the comparison and poured forth scathing remarks on the ignorance and presumption that would raise the anvil and forge to a level with the easel and palette. The Commissioner laughingly replied that his position justified, if it did not require, him to uphold the dignity of mechanical professions. "Mechanicians and artists" he observed, "are both children of inspiration, differing only in the medium of their manifestations—one portrays his thoughts on canvas, the other casts them in workshops, and places the things themselves, instead of their pictures, before you. There is some difference between a steamship and the finest painting of one. Had the Greeks (whom you, Mr. Vanderlyn, worship) honored the mechanic arts more, and those which ministered to the vanity of their leaders less, they had left a brighter history. Some of their great thinkers were sensible of the error and have left a memorable proof of their conviction."

"What in the devil's name is that?" exclaimed Vanderlyn.

"Why, this—instead of awarding the goddess of beauty to the patron of the fine arts, they gave her to a blacksmith; and, as if to mark the moral with the keenest emphasis, that blacksmith was a homely, awkward and limping one! Such a decision may excite disgust in painters and sculptors, proud of their profession; but there is no getting rid of the fact that, on the sole ground of mechanical talent, an artisan—deformed, halting on a broken leg, his face and breast blackened with smoke and his hands hardening into horn—is represented as bearing off the great prize of beauty in the face of the handsome and all-accomplished Apollo himself!"

There was no reviving Vanderlyn's good humor after this; nor would he offer any other reading of the riddle.

## VALUABLE RECEIPTS.

Dyeing Mixed Goods Black.—Cloth made of a mixture of cotton and wool or flax and wool has become very common, and in order to obtain black goods of this composition, the practice formerly pursued was to dye the cotton warp first, then the wool of the filling or weft afterwards. It is very difficult to dye fabrics composed of mixed vegetable and animal fibers. They are so different in their nature that different processes are generally required to dye them the same color. Difficulties having been experienced in dyeing mixed cloth black by the old mode of coloring the cotton first, and a superior and more convenient mode has been desired. This is secured by coloring the wool in the piece of cloth first, and the cotton afterwards. The wool is prepared by boiling it first in a mordant of the bichromate of potash, then in a bath of a decoction of logwood, in the usual way now practiced of dyeing black on wool. After the cloth is washed it is steeped for about six hours in a weak decoction of sumac—one pound of sumac being sufficient for ten pounds of cloth. The sumac liquor must be cold or it will tend to make the wool brown in color. After this the piece of cloth is run through some weak lime-water, then through a weak solution of the sulphate of iron, aired and washed. After this it is again run through a weak liquor of logwood, washed, dried and the processes are complete. The acetate of iron is superior to the sulphate of iron for treating the cloth in the second process, and is to be preferred when it can be obtained. Black on cotton soon fades, and becomes a slate color when exposed to sunlight and rain. This is one reason why some mixed woolen and cotton goods soon become faded in appearance. The sulphate of copper is sometimes used for dyeing black on wool, especially for homespun cloth. It is an objectionable substance to use for this purpose, as the light acts upon black thus dyed, and it soon fades into a dirty drab shade. The same process that is pursued to color cotton will also color flax. Fast blacks are dyed on cotton for the cloth of Scotch gingham designed for umbrella oovers, by dyeing it first a dark indigo blue, then a black on the top of this with sumac, copperas and logwood. A fast black can also be dyed upon cotton and flax with madder as a substitute for logwood, but these fast blacks are very expensive. It is not generally known that the dyeing of vegetable fibers, such as cotton and flax, involves far more intricate processes, more skill and expense than the coloring of wool and silk. Aniline colors have not yet been applied to dye cotton except for very light shades, they being too expensive for cheap fabrics.

Cleaning Kid Gloves.—When kid gloves are stained with grease and dirt they may be cleaned with a composition of benzole containing a few drops of ether. The glooves are to be laid upon a board, then rubbed with a sponge containing the fluid, after which they are dipped in the fluid, squeezed, rubbed with the sponge dry upon the board, then expanded by blowing into the opening for the hand, and when all the fingers are opened full they are hung up to dry. This cleaning operation will not restore faded colors. Common burning fluid, composed of four parts of alcohol and one part of turpentine, will answer for cleaning kid glooves nearly as well as the benzole fluid. In using such fluids care must be exercised to conduct the operation at a distance from fire, as the vapor which is generatad is very combustible, and will explode if ignited.

## THE ABUSE OF FILES.

There are by far too many files wasted and misused in ordinary work, and the abuse is one that should be checked at once. To judge from the treatment some persons bestow on these costly tools, they are as common as pins and about as valuable, A new file is used for fitting a Babbitt metal box to a shaft, or a file for brass-work is used alike on iron and brass; and then another must be procured when the workman desires to finish brass again. And so the interchange goes on, until the consequence is that the workman guilty of such carelessness has no file of any kind, fit for any purpose in his drawer. Hard steel makes no difference to a file-abuser either. Apparently there are some individuals who think that because a diamond will cut another diamond, so a file must bite another file; they pursue this theory and rasp away on the scale of cast-iron, or over the black places in forgings, with an utter disregard of their employers' time and money. A fifteen-inch flat bastard file costs from a dollar to a dollar and a half, but we have seen one of these tools placed *hors du combat* in five minutes by the blundering stupidity, not to say criminality, of the person using it. If the individual had been obliged to buy it himself, it is hardly to be supposed that he would have treated it in such a manner. It contributes in no wise to the reputation of any workman to be careless of tools that he uses but is not obliged to purchase, and it would be much better for all parties if a little more consideration was given to this matter.

### Vessels on the Lakes.

The immense amount of capital invested in the commerce of our great lakes, is hardly realized by the public outside of business circles immediately interested in the trade.

The following statement of sail and steam vessels now engaged in this business is compiled from the "Marine Register" for 1863, just issued by the Board of Lake Underwriters:—Steamers, 134; propellers and tugs, 253; barks and barkantines, 191; brigs and brigantines, 79; schooners, 1,030; sloops, 14; barges, 60. Total, 1,761.

## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

*Device for molding Pottery-ware.*—This invention relates to a new and improved machine for molding elliptical dishes of pottery-ware, and consists in the employment of an upright eccentric lathe in connection with a yielding "former" and also with a cam to operate said former when required. The object of the invention is to attain a device which will supersede the ordinary exclusive manual process of forming pottery-ware vessels of this kind, by admitting of the desired work being performed more expeditiously and in a more perfect manner. R. J. Marcher, of New York city, is the inventor of this device.

*Sewing Machine.*—This invention relates to sewing machines for making a running stitch with a needle of the kind used for hand-sewing, such needle being placed between feed rollers which gather up the cloth and feed it along in such a manner that the said needle passes through and through it, first from one side and then from the other. Its object is to avoid the necessity of stopping the machine and taking out the work when a certain length has been performed, which is so great an objection to other machines of this class, and to render continuous the stitching of a piece of cloth of any length. It consists, principally, in the arrangement of the rollers which hold the needle and feed the cloth, in a vibrating frame, and in the employment, in combination with such frame, of a stationary throat by which the cloth is conducted to the feed rollers and needle in such manner that the point of the needle will be caused by the vibrating movement of the frame to enter the cloth from opposite sides alternately ; also in the employment of a reciprocating thimble which serves as a bearing for the head of the needle at the time of the operation of the feed rolls, but which, by its reciprocating movement, allows the cloth to pass over and off the head of the needle ; also in the employment, in combination with such reciprocating thimble, of a tooth or catch, which takes hold of the cloth and pulls it over the head of the needle as the said thimble moves back therefrom. This invention has been assigned to Madame Demorest, of 473 Broadway, New York, by the patentee, William G. Cook, also of this city.

*Safety Valve for Steam Boilers.*—This invention, which is applicable to steam boilers, digesters, rubber vulcanizing vessels, and all other vessels in which steam may be generated, partakes partly of the characters of what is known as a safety valve and of what is known as a fusible safety-plug, and is intended to combine the advantages of both these devices, and to insure the letting-off the steam when it arrives at a higher pressure or temperature than is safe or desirable. Hitherto fusible plugs have generally been secured by riveting or by screwing the alloy into a hole in the boiler or by fusing the alloy into the hole, letting a portion flow through and form a head on the inside. In all of these modes, steam begins to escape the moment the most fusible portion of the mold begins to liquify and long before the plug has so far lost its tenacity as to be dislodged ; the time of dislodgment varying just in proportion to the mechanical force exerted by that portion which forms the head inside or the screw-thread within the hole ; the same composition in the same size hole blowing out at temperatures varying from 340° to 400° Fah., and in some instances not till the vessel explodes. A fusible plug has also been inserted or formed within a conical seat provided in the top of an inverted cup arranged in the part of the boiler above the fire-box, but this position of the plug, for some reasons, is objectionable. The object of this invention is to obviate these difficulties, and to this end it consists in drilling a taper hole from the outside of the boiler or other vessel into the steam space, leaving the hole very small on the inside of the vessel, and fitting to this hole a valve or valve-like plug of brass or other metal or alloy, which is infusible at any temperature to which it can possibly be subjected by the steam, and soldering this plug into the hole or seat with a fusible alloy. G. E. Hayes, of Buffalo, N. Y., is the inventor of this improvement.


## ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 16, 1863.

*Reported Officially for the Scientific American.*

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

38,875.—School Globe.—J. R. Agnew, Mercersburgh, Pa.:

I claim the arrangement of the case, B, in combination with a celestial or with a terrestrial globe, constructed and arranged substantially as and for the purpose herein shown and described.

And I also claim the arrangement of the folds or ribs, d, in the flexible case, B, in combination with the horizon, C, and globe, A, constructed and operating substantially as and for the purpose specified.

[An engraving and full description of this invention, together with other valuable improvements in school globes, patented by the same inventor, will be published shortly in the SCIENTIFIC AMERICAN.]

38,876.—Hinge for Blinds.—Wm. L. Barnes, Kingston, N. Y. :

I claim the swinging blocking pieces, g, hinged to the leaf, a, of the hinge, in combination with the projection, f, on the leaf, d, for the purposes and as specified.

38,877.—Machine for Round Tenons.—Ira L. Beckwith, Providence, R. I. :

I claim the improved spoke-tenoning tool or machine, as provided, not only with the separate guide tube, B, and its socket, g, but as having one or more adjustable cutter carriers, k k, made and applied to its stock, A, substantially as hereinbefore specified.

I also claim the guide tube, B, as made with a recess, i, for the reception of the cutter and its carrier, such recess being arranged in the said guide tube, as and for the purpose specified.

I also claim the arrangement of the cutter rest, f, the adjustable cutter carrier, k, and the clamping and adjustable screws or devices, n n, of the latter.

38,878.—Apparatus for dipping Lucifer Matches.—S. A. Bell, Epping Villas, Stratford, England, and Thomas Higgins, Carrico Terrace, Middlesex County, England. Patented in England Aug. 16, 1862 :

We claim submitting splints or matches to the dipping operation by presenting their ends to a continuous supply of the phosphorus or other like ignitible compound, in the manner above described.

[This invention relates to means for effecting the coating of the ends of splints or matches with the compound that ignites by applying friction thereto ; its chief object is to present the splints, while contained in a traversing clamp or frame, endwise, to a continuous supply of phosphorus or other like ignitible compound evenly covering a containing surface, and thereby enable the matches to take up a suitable supply of the compound on their ends as they pass through the machine ; this arrangement not only facilitates the dipping operation but also removes the liability of the workman contracting the disease now common among those who have to handle the phosphorus compounds.]

38,879.—Coal-oil Lamp.—W. B. Billings, New York City. Ante-dated June 10, 1863 :

I claim, first, The impelled current of air when carried into the self generating burner for the purpose and in the manner substantially as set forth.

Second, The mixing or mingling of the self-generated vapor with the impelled current of air in the burner, near the point of combustion.

38,880.—Bellows.—R. Boeklen, Brooklyn, N. Y., and L. Planer, New York City. Ante-dated Sept. 1, 1862 :

We claim the employment or use of the ball valves, f f, placed in a box, C, provided with a central partition, g, and applied to the double acting bellows, as and for the purpose herein set forth.

38,881.—Lamp Chimney.—Henry Booth, Jr., New York City :

I claim the combination of the lower glass portion, D, of the chimney, with the metal tube portion, E, when the latter has pendent rods, c c, attached to it, which are fixed in tubes, C C, connected to a ring or band, A, placed on the burner, B, and all arranged substantially as and for the purpose herein set forth.

[This invention relates to an improvement in that class of lamp chimneys which are composed of metal and glass, that is to say, of a glass bulb, cone or cylinder, and a metal tube, the former being at the upper end of the latter.]

38,882.—Harvester.—John Butter, Buffalo, N. Y. Ante-dated May 5, 1863 :

I claim, first, changing the gearing in a combined reaping and mowing machine, in the manner and for the purposes set forth.

Second, I also claim the combination of the shoe which supports the heel of the finger beam when the machine is used for a mower with the yielding supports of the finger beam with the main frame, in such a manner as that, by simply turning said shoe, one quarter over, the finger beam can be attached to the same shoe piece for reaping, and the same connecting rod used, while the finger beam is left free to rise and fall, substantially as described.

Third, I also claim the tubular part, H, in combination with the finger beam supports, J and K, arranged in relation to each other for the purposes stated.

Fourth, I also claim the combination of the finger beam, I, and brace, L, with the tubular part, H, and its lugs, o and p, substantially as and for the purposes set forth.

Fifth, I also claim the frame, G, as a support for shafts, f and e, substantially as set forth.

Sixth, I also claim the frame, G, in combination with the supporting plates, F F, substantially as set forth.

Seventh, I also claim the combination of the yielding slotted brace, N, with frame, G, substantially as set forth.

38,883.—Tobacco Pipe.—Charles Chinnock, Brooklyn, N. Y. :

I claim the pointed and punctured tube, d, the movable cap, cigar and pipe-holder, b, for the purposes set forth.

38,884.—Cultivator.—Philip Coonrad, Keithesburgh, Ill. Ante-dated June 2, 1863 :

I claim the combination of the stationary frame, D, and the rising and falling frame, E, when the latter is provided with the laterally adjustable plows, F, and guards, M, arranged with the bars or levers, j j, operated through the medium of the foot lever, J, or hand lever, I, as herein set forth.

I further claim the lever, u, connected with the frame, E, through the medium of the shaft, L, crank, s', and link, s, but this I only claim when used in connection with the laterally-adjustable plows, F, and the means employed for operating as herein described.

[This invention relates to an improved cultivator of that class designed for plowing corn and other crops which are grown in hills or drills ; its object is to obtain a simple machine for the purpose specified and one which will, by an extremely simple arrangement of parts, admit of the plows, which adjoin the rows of plants, being adjusted laterally so as to conform to the sinuosities of the latter.]

38,885.—Furnace.—N. F. B. de Chodzko, Paris, France. Patented in England June 27, 1862 :

I claim, first, The improvement in dividing the furnace into upper and lower fire grates or compartments.

Second, The lugs, projections or hooks at one end of the fire-bars to keep them in their proper position.

Third, The deflector over the lower fire grate to deflect the gases or smoke on to the surface of the heated coke. The combination of a furnace divided into upper and lower fire grates with the deflector over the lower fire grate, substantially as above set forth.

38,886.—Hulling and dressing Rice.—Silas Dodson, of Bloomsburg, Pa. :

I claim the combination of the bevel-faced stones, C' C'', and the straight-faced stone, C, with the central shaft, D, screen, B, stone, E, straight-faced upon one side and beveled upon the other, and the double-beveled stone, E', as herein shown and described.

Having the stone, E, made adjustable upon the shaft, D, independently of the stone, E', in the manner and for the purpose herein shown and described.

The arrangement of the screw, H, with the shaft, D, in the manner herein shown and described, whereby the speed and direction of motion of said screw may be changed and governed without altering the velocity of the shaft, D, or that of the stones, all as set forth.

[This invention relates to a new and improved machine for hulling and dressing rice, that is to say, for removing the hulls from the rice and dressing it of the inner coating or pellicle of the grain, the whole work being done simultaneously and in a perfect manner.]

38,887.—Water Wheel.—Daniel Doncaster, Punxutawney, Pa. :

I claim, first, The combination of a turbine, A, with a guide wheel, C, and an adjustable suspension frame, E, when arranged and operating substantially in the manner described, for the purposes set forth.

Second, the combination of the turbine, A, and adjustable gate, G, when constructed, arranged, and operated substantially in the manner, and for the purposes set forth.

Third, the combination of an adjustable guide frame, a guide wheel, and a turbine, with a gate arranged below the same ; the whole operating substantially in the manner described and for the purposes specified.

38,888.—Machine for cleaning Animals' Intestines.—C. F. Dortenbach, Cleveland, Ohio :

I claim, in combination with the rotary scrapers, K, the inclined adjustable table, C, for cleaning the intestines of animals, substantially in the manner herein described.

I also claim in combination with the adjustable table, C, the springs, E, for the purpose of causing the table to yield to the pressure of the scrapers to protect the intestines from being injured by the scrapers, substantially in the manner herein described.

I also claim, in combination with the rotary scraping cylinder and adjustable table, the rod, P, and the convex scrapers, p, for the purpose of turning the intestines inside out, substantially in the manner herein set forth.

38,889.—Horse Collar.—Cubitt Durrant, Lyndonville, N.Y.:

I claim, as a new article of manufacture, the improved horse collar herein described, the skeleton or foundation being composed of braids of flags or rushes, and the stuffing composed of rushes or other stalks, retained in place by the transverse fringe or covering, g, to give additional strength and covered by the cloth lining, k, the whole constructed and arranged substantially as herein set forth.

38,890.—Piston for Steam Engines.—H. D. Dunbar, Hartland, Vt. :

I claim, first, Covering the cuts of packing rings by flat plates fastened at one side of the cut, and fitting said plates into recesses in the ment ring for the purpose of preventing the passage of steam through the joints, substantially as described.

And I claim, in combination with plates for covering the cuts packing rings, the pivoting of said plates to one side of the cut, and so that when in their recesses they will allow the rings to move upon upon them as they expand or contract, substantially as described.

38,891.—Churn.—S. F. Emerson, Seville, Ohio :

I claim the combination of the tubes, E E, with the dasher, D, in the manner and for the purpose herein shown and described.

[This invention relates to an improvement in that class of churns in which rotary dashers are used, and consists in using with a dasher of peculiar construction two or more tubes connected with the dasher shaft and arranged in such a manner as to conduct, by their rotation, air down into the cream, and also to serve as beaters, whereby butter of a superior quality is obtained in a short time.]

38,892.—Pencil-eraser and Stamp.—Eberhard Faber, New York City :

I claim as an improved article of manufacture a lead pencil provided with an angulated rubber-seal head, as herein shown and described, which serves as a seal, a preventer against rolling and as an eraser, all as set forth.

[This invention consists in placing and securing on one end of an ordinary wooden-cased lead pencil a knob or piece of india-rubber, the latter being of such dimensions that it will serve as an eraser of the pencil marks and of such a form that it will also serve as a seal or stamp, and at the same time prevent the pencil from rolling off a table or desk.]

38,893.—Apparatus for the Manufacture of Salt.—C. S. Farrar, Romeo, Mich. Ante-dated Feb. 27, 1863 :

I claim, first, the improved arrangement of the vats, A B and C, constructed and operated substantially in the manner and for the purpose set forth and described.

Second, I claim the grates, D D, in connection with the steam pipes, m m, as set forth and described.

38,894.—Liquid for Galvanic Batteries.—D. H. Fitch, Jr., Litchfield, Ill. :

I claim the use of chlorate of potassa in combination with sulphuric acid and water for the purpose specified.

I also claim the use of the salts of chloric acid in combination with sulphuric acid and water, for the purpose specified, their action being substantially the same as chlorate of potassa.

38,895.—Hat.—F. P. Flanagan, Newark, N. J. :

I claim, first, The employment, in combination with a coating of hatter's varnish to secure a covering of felt, cloth, plush or other woven fabric, to a hat body made of palm leaf or other material of similar character, of a coating of india-rubber solution applied to the body preparatory to the application of the hatter's varnish, substantially as and for the purpose herein specified.

Second, The binding strip, a, pasted over the edge of the brim preparatory to the application of and in combination with the covering, b, substantially as and for the purpose herein specified.

38,896.—Sheep Rack.—J. B. Freeman, Lebanon, N. Y. :

I claim the combination of the hay rack, C, and troughs, E E, placed within a frame, A, provided with lids, D D, and all arranged as and for the purpose herein set forth.

[This invention consists in combining a hay rack and feed troughs in such a manner that a very convenient and economical feeding device is obtained and one which will prevent the waste of fodder by the sheep.]

38,897.—India-rubber Whip Socket.—Chas. Goodyear, Jr., New York City :

I claim the manufacture of soft vulcanized india-rubber whip sockets, substantially as hereinbefore described.

38,898.—Power Mortising Machine.—G. W. Gould, Norwich, Conn. :

I claim, first, The iron frame, C, cast whole—top, bottom and sides

—and the arrangement of the four guides, one on each corner of the same, D D D D, Fig. 3.

Second, The arrangement of the iron rods and screws, E E, connecting with the sleeves, F F, for the support of the rest, B.

Third, The rack, G, and lever, H, by which the rest is raised or lowered with ease and accuracy.

Fourth, The auxiliary boring attachment by which it is moved and held in position without stopping the machine, and its connection with the expanding attachment of the bit shaft, and the pulley, frame, card and weight.

38,899.—Safety Valve.—G. E. Hayes, Buffalo, N. Y.:

I claim the conical valve or plug, b, of infusible metal or alloy soldered into the hole or seat, a, provided for its reception in the boiler or other vessel, by means of a fusible alloy, substantially as and for the purpose herein specified.

38,900.—Washing Machine.—J. M. Homer, San Jose Mission, Cal.:

I claim, first, The bottom of the reservoir or washing chamber having the plain central and the curved and corrugated portions as recited, in combination with and in relation to the mauls, as set forth.

Second, The arrangement of the vertical weighted lever, u, the horizontal rod, t, the horizontal lever, p, and rods, r, for operating the uprights and mauls, as herein described.

38,901.—Boiler for making Paper Pulp.—M. L. Keen, Royer's Ford, Pa.:

I claim, first, a boiler provided with a perforated diaphragm and well or their substantial equivalents, arranged in the manner and for the purpose described.

I also claim, in combination with the boiler, the arrangement of the discharge pipe and valve for the purpose of blowing out or discharging the contents of the boiler under pressure, substantially as and for the purpose set forth.

38,902.—Ash Pan.—J. A. Lawson, Troy, N. Y. Ante-dated April 17, 1863:

I claim the bail, C, in combination with the ash pan drawer, A, and with the slops, a a, and handle, B, substantially as and for the purposes as herein described and set forth.

38,903.—Breech-loading Fire-arm.—O. D. Lull, Watkins, N. Y.:

I claim, first, The cartridge, L M, constructed substantially as set forth in the described combination with the longitudinally sliding hammer, e, open barrel, B, longitudinal slot, a, and lateral cavity, a', arranged to operate as explained.

Second, The combination of the sliding hammer, C, spring, D, rods, E E, and lever, G, constructed, arranged and operating as described, in connection with the cylindrical metallic cartridge, L M, and longitudinal nipple, N.

Third, The specific arrangement of the dog, H, spring, I, trigger, J, and set screw, K, in combination with the sliding hammer, C.

[This is a simple, safe and effective form of breech-loading gun The invention is valuable in permitting rapid firing and preventing danger of fouling or derangement of parts.]

38,904.—Draughting Scale.—Josiah Lyman, Lenox, Mass.:

I claim, first, The combination and arrangement, in the manner described and for the purpose set forth, of a triangular and quadrangular scale with a screw micrometer, by which distances on paper or otherwise may be measured, read, or laid down with mathematical precision.

Second, I claim the arrangement as set forth for exchanging one micrometer circle for another suited to any one of the several scales.

Third, I claim the peculiar arrangement of the screw-tube, by which a smooth, uniform friction is given to its action, and all perceptible error from play or other causes is excluded from the readings of the micrometer circle.

Fourth, I also claim the arrangement as set forth of the spring attachment, by which this draughting scale may be brought into connection with, and become a part of the protracting trignometer.

38,905.—Molding Pottery-ware.—Robert J. Marcher, New York City:

I claim, first, The combination of an eccentric chuck or lathe and a mold, arranged substantially as herein shown and described.

Second, The bar, H, with a pendent plate or former, k, attached, in combination with the mold and eccentric chuck or lathe, for the purpose specified.

Third, The cam, O, and spring, N, or its equivalent, arranged to operate in connection with the plate or former, k, mold, L, and eccentric chuck or lathe, for the purpose set forth.

38,906.—Furnace for reducing and smelting Ores.—Loomis G. Marshall (assignor to himself and Andrew Cochran), Philadelphia, Pa.:

I claim the arrangement of the reservoir of water at top of stack in combination with a reservoir at side of stack (containing the refining flux) with their connecting pipes that conduct the heated water and flux to the side wings below.

I also claim the four side wings with their connecting pipes, movable top, and perforated incline bosh, as arranged in combination with the smelting furnace, for the purpose of smelting and refining the ores, and drawing off the fluid continually while the fluxing is going on in the bosh.

38,907.—Skate.—J. J. McCormick, Brooklyn, N. Y.:

I claim a foot-stand, A, for a skate, struck up with the socket, a, for the heel out of one piece of sheet metal, in the manner shown and described.

I also claim as a new article of manufacture a skate having a foot-stand with socket for the heel struck up out of one piece of sheet metal, and provided with a set screw, b, and spring clamps, c, as and for the purpose specified.

[This invention consists in a skate having the foot-stand with a socket for the heel struck up of one piece of metal, and provided with spring clamps in front and with a set screw behind in such a manner that a firm, cheap and durable support for the foot is provided, and that by drawing the spring clamp over the edge of the sole of the boot or shoe to which the skate is to be secured, and screwing up the set screw against the heel the skate is firmly retained in its place.]

38,908.—Boring Machine.—John Meyer, Brooklyn, N. Y.

I claim the arrangement of the adjustable disk, D, on the shaft, B, in combination with the bevel gear, E F, extension shaft, G, bevel gear, I J, curved rotary arm, h, and bore spindle, H, all constructed and operating substantially as and for the purpose herein shown and described.

38,909—Shirt Collars.—Julius A. Pease, New York City:

I claim a shirt-collar made by covering a metal frame with waterproof enameled cloth, or other material, substantially as before described.

38,910.—Iron Bridge.—Simeon S. Post, of Jersey City, N. J.:

I claim, first, The joint box-connecting segments of the top chord or plate, and also receiving the heads of the posts or struts and braces, with the loose pin, k, passing through the whole.

Second, A cylindrical joint in the construction of a bridge, as shown at B, irrespective of its location, when used for the purpose of obviating the dangers of expansion and contraction.

Third, The slotted chord, when used in connection with the cylindrical joint and for the same purpose.

Fourth, The construction of the chord when used in combination with the cylindrical joint, substantially as described and shown.

38,911.—Machine for splitting Match Blocks.—Van Rensselaer Powell, Troy, N. Y.:

I claim, first, The combination of a suitable bed or support, A, for the match blocks, a splitting knife, B, having an edgewise reciprocating movement toward and from, but not to or past the said bed, a set of feed rolls, C C', and a presser, D, whereby each succeeding match block is moved along on the bed, and pressed against, and thereby made to support and feed to and past the knife the rear portion of the next preceding block, substantially as herein described.

Second, I also claim the combination of a match-block support, A, presser, D, feed rolls, C C', and a splitting knife, B, having an edgewise reciprocating movement toward and from but not to or past the said match-block support, and also a movement sideways, so that the knife will follow the inclination of the grain of the wood in splitting into the block, and return to the proper place for starting a new split on withdrawing from the block, substantially as herein described.

Third, I also claim a match-block splitter having devices for holding match blocks and successively feeding them with an uninterrupted or continuous movement to a splitting knife mounted so as to strike into but not through the match block, and be moved sideways with and by the moving block while in the latter, and be returned to the proper place to make a new cut upon being drawn out of the moving block, substantially as herein set forth.

Fourth, I also claim the spurs or projections, E, when arranged in combination with a bed, A, splitting knife, B, presser, D, and feed rolls, C C', or their equivalent for pushing the match block along on on the bed and past the splitting knife by means of a succeeding match block, substantially as herein described.

Fifth, I also claim the yielding holder, G, when arranged in combination with a splitting knife, B, presser, D, feed rolls, C C', and bed, A, with or without the spurs, E, as herein described.

Sixth, I also claim the supplemental presser, I, when arranged in combination with the shedding presser, D, bed, A, knife, B, and feed rolls, C C', substantially as herein described.

38,912.—Mold for casting Sheaves.—Samual Ray, Alliance, Ohio:

I claim the employment or use of the plate or "lifter," B, in combination with the follow board, A, and flasks, C D, all constructed and operating in the manner and for the purpose substantially as shown and described.

[This invention consists in the employment of a plate or "lifter," with one or more holes, which, in addition to its use of lifting the sand or main body of mold, also serves as a support to the mold and prevents it from being crushed by the upper part of the flask being closed on it after the patterns are withdrawn.]

38,913.—Fastening for Blind Slats.—Wm. F. Redding, Utica, N. Y.:

I claim the rod, D, secured to the lower slat rod, b', and provided with an eye, d, at its lower end; in combination with the spring or elastic plate, E, provided with recesses, f, and secured to the lower cross-piece, e, of the blind, either with or without the plate, $D^2$, as and for the purpose herein set forth.

[This invention relates to a new and improved catch or fastening applied to window-blinds and arranged in such a manner that the slats of the blind may be secured in an open or closed state and at different points between those two positions as may be desired; the slats at the same time being prevented from being moved from the outer side of the blind.]

38,914.—Wrench.—J. J. Richardson, Woodstock, Vt.:

I claim the ratchet, C, provided with two bosses, d d, which are fitted loosely in eyes at the ends of the parts, a a', of the shank, B, in combination with the pawls, E E', spring, F, and removable socket, D, all arranged to operate as and for the purpose set forth.

[This invention consists in the employment or use of a ratchet, two pawls, a spring, and a removable socket arranged and combined in such a manner that a nut may be turned by an oscillating movement without taking the wrench from it, and the same wrench rendered capable of being applied to different sized nuts.]

38,915.—Rice-cleaner.—Charles E. Rowan, Brooklyn, N. Y.:

I claim the movable perforated metallic plates, receiving the headed pins as aforesaid, and applied to the surfaces of rice-cleaning machines, for the purposes and as specified.

38,916.—Machine for breaking and cleaning Flax, Hemp, &c.—Gelston Sanford & James E. Mallory, New York City:

We claim the combination of the large fluted roller, having a continuous and regular rotary motion as described, in combination with one or more small fluted rollers having a reciprocating rotary motion imparted substantially as herein described, the flutes of the small roller or rollers meshing into the flutes of the large roller, and rolling alternately in opposite directions on the periphery thereof, substantially as and for the purpose specified.

38,917.—Frog for Railroad Switches.—Thomas Sharp, Chicago, Ill.:

I claim, first, Providing the frog of a railroad switch, with an additional groove, substantially as and for the purposes herein specified and shown.

Second, I claim the combination of the wrought iron or malleable iron track, with the cast iron bed or base, substantially in the manner and for the purpose herein delineated and set forth.

38,918.—Cooking Stove.—Jacob Shavor & Albert C. Corse, Troy, N. Y.:

We claim the combination of the damper, d, with the front plate, t, and with the fire-box or chamber, a, substantially as herein described and set forth.

We also claim the combination of the air tube, o, with the curved or inclined plate, w, and with the air-chamber, j, substantially as herein described and set forth.

38,919.—Means of setting up Ship's Rigging.—Samuel Smith & Wm. H. Fludder, Newport, R. I.:

We claim, first, The lanyard composed of a metal tube, A, and rod B, combined with each other, and with the shroud, stay or other portion of the standing rigging substantially as herein specified.

Second, The employment in combination with such lanyard of a strap, l, or its equivalent, screw blocks, F F', and a screw or screws, G, substantially as and for the purpose herein described.

[This invention consists in an improved construction of an iron or other metal lanyard and mode of combining the same with the shroud or stay, also in a mode of combining screw blocks and screws with such a lanyard for the purpose of shortening it to set up the shroud or stay.]

38,920.—Spring Hook Fastening for Garments.—David M. Smith, Springfield, Vt.:

I claim extending the free or disengaged end, a', of the spring or elastic hook, B, through an oblong slot, b, in the back plate, c, of the button or knob, A, substantially as and for the purpose herein set forth.

[This invention relates to an improvement on a hook or fastening designed more especially for soldier's india-rubber wrappers or blankets to secure the same on the wearer and also to fasten the wrappers or blankets together to form tents or coverings for a plurality of men.]

38,921.—Revolving Fire-arm.—Horace Smith & Daniel B. Wesson, Springfield, Mass.:

We claim the movable breech-pin, C, applied in combination with the revolving cylinder having its chambers extended through its rear, to operate substantially as and for the purpose herein specified.

[This invention relates to that class of revolving fire arms which have the chambers extended right through the cylinder for loading from the rear. The metallic shells or cases of the cartridges commonly used in such arms are made to protrude a short distance from the rear end of the cylinder, and the flanged parts so protruding are frequently so expanded by the explosion of the charge as to cause them to bind between the cylinder and the recoil shield and make the cylinder revolve very hard. The object of the improvement is to prevent this binding of the cartridge shell and so insure the easy revolution of the cylinders; and to this end it consists in fitting the recoil shield with a sliding breech-pin arranged opposite to and in line with the barrel and so operated by the lock as to move forward as the hammer falls to strike, for the purpose of supporting the cartridge which is brought in line with the barrel and of holding the said cartridge in place at the time of firing, and to move back again and leave the shell of the said cartridge free as the hammer is re cocked.]

38,922.—Centering Device for Lathes.—Joseph A. Talpey, Somerville, Mass.:

I claim the tube, A, punch, B, arms, E, and conical slide, F, all combined and arranged to operate substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a simple and efficient device for expeditiously centering the ends of shafts and other articles which are to be turned in lathes. The invention consists in the employment or use of a tube provided externally with three or more pivoted cams and a conical slide, and having fitted within it a punch with a spring applied to it, the whole being so arranged and organized that by simply applying the end of the tube to the end of the article to be centered and shoving the conical slide on the tube the arms will grasp the article to be turned and adjust the tube to the centers of the article, which is centered by driving the punch into the end of the shaft.]

38,923.—Friction Match Stand.—Nathaniel Waterman, Boston, Mass.:

I claim the above-described improved match stand and rubber made with the receiving or intercepting channel applied to or about its base, as specified.

And I claim the match stand as made with the intercepting channel, and with the flutings or grooves arranged with respect to the said channel as specified.

38,924.—Machine for nailing Boxes.—George Wicke, New York City:

I claim, first, The employment of the grooved spring jaws, H, substantially as described, for the purpose of receiving the nails and to guide them to their proper places.

Second, The combination with the spring jaws, H, of the rising and falling plunger, E, constructed and operating substantially as and for the purpose described.

Third, Arranging the plunger, E, with a disk-shaped collar, i, or its equivalent to operate in combination with the spring jaws, H, substantially as and for the purpose specified.

Fourth, The arrangement of the circular portion, e f, on the cam, C, to operate in combination with the gate, B, and treadle, d, substantially as and for the purpose set forth.

Fifth, The arrangement and combination of one or more adjustable carriages, F, table, J, and slide, J, constructed and operating in the manner and for the purpose substantially as specified.

38,925.—Bee-hive.—A. T. Wright, Oskaloosa, Iowa:

I claim, first, The employment or use of a series of frames, f, placed upon a suitable trestle or support, A, and secured in proper contact with each other by means of a clamping device formed of the longitudinal bars, C C, cross-bars, E, springs, I, bars, H, and with or without the wedges, J, all arranged and combined substantially as and for the purpose herein set forth.

Second, The roof or cover, k, applied to the frames, f, and secured thereto and to the trestle, A, by means of the hook, l, formed at the ends of rods, L, provided with springs, M, substantially as set forth.

Third, The trestle, A, constructed substantially as shown and provided with an alighting board, d, when used in connection with the hive formed of the frames, f, clamped together substantially as herein described.

[The object of this invention is to obtain a bee-hive which will be better adapted than usual to the habits and instinctive requirements of the bee and which will afford a convenience in the management of both the bees and the hive with regard to every department of bee culture.]

38,926.—Lamp Burner.—P. J. Clark (assignor to S. S. Clark), West Meriden, Conn.:

I claim the two inclined wick-tubes, d d, when closed by plates, f, at their edges or narrow sides to form a draught-space, g, and provided with elevated outer sides, 2, and inner sides 1, on a level with the upper edges of the plate, f, and fitted at their lower ends in a box, a, into which air is admitted into the space, g, formed by the wick tubes and plates, f, the wick tubes being curved in their horizontal section and all arranged as and for the purpose herein set forth.

[This invention relates to an improved lamp burner of that class designed for burning coal oil without the aid of a draught chimney and is more especially designed for the lamps of lanterns, although it may be advantageously used for ordinary hand-lamps.]

38,927.—Sewing Machine.—William G. Cook (assignor to Ellen L. Demorest), New York City:

I claim, first, The arrangement of the feeding and needle-holding rollers, a a' b b', in a vibrating frame, C D, substantially as and for the purpose herein specified.

Second, The reciprocating thimble, G, applied in combination with the feeding and needle-holding rollers, a a', b b', to operate substantially as and for the purpose herein described.

Third, The hook, T, applied to operate in combination with the reciprocating thimble, G, and feeding and needle-holding rollers, a a' b b', to operate substantially as and for the purpose herein specified.

38,928.—Mode of fastening Doors of Hay and Cotton Presses.—Platt C. Ingersoll (assignor to himself and H. F. Dougherty), Greenpoint, N. Y.:

I claim, first, The levers, C, attached to the doors of a press with their fastenings, E and F, as and for the purpose described.

Second, The levers, I, and their mode of hanging, fastening and operating as and for the purpose specified.

Third, The projections, G, for the purpose described.

38,929.—Jacquard Loom.—H. W. Hensel & L. D. Valetton (assignors to the said H. W. Hensel), Philadelphia, Pa.:

We claim the sliding bar, H, and the horizontal projection, i, arranged on the lathe of a Jacquard loom in respect to the warp threads substantially as set forth, for operating on the said warp threads in the manner and for the purpose specified.

38,930.—Annealing Glass Ware.—Edward Dithridge (assignor to Edward D. Dithridge), Pittsburgh, Pa.:

I claim the annealing of glass ware by enclosing it immediately after it is made, and while yet hot in close compartments or boxes of such size as that the air confined therein will be readily heated by the glass article or articles placed therein; and keeping the glass ware thus confined and excluded from the external air until it becomes cold or nearly so; thereby securing the gradual cooling of glass ware without the use of leers or the application of artificial heat other than that which is contained in the articles themselves when placed in the annealing boxes.

Also the use of annealing apparatus for glass ware, consisting of a series of compartments, capable of being readily closed as the glass articles are placed therein, and constructed of wood, fire-brick or other suitable substance, substantially in the manner and for the purposes herein before set forth.

38,931.—Sewing Machine.—James S. McCurdy (assignor to Elias Howe, Jr.), Brooklyn, N. Y.:

I claim, first, The spring, m, applied to the detached or independent revolving looper, substantially as and for the purpose herein specified.

Second, The plate, n, applied in combination with the revolving looper and the looper-driving disk, G, substantially as and for the purpose herein specified.

[This invention relates to single-thread sewing machines making chain stitch, particularly to those which use a revolving detached or independent looper operating in connection with a revolving needle in such manner as to effect the enchaining of the loops of its thread by passing entirely through them. It consists in the arrangement of such looper to revolve within and around a cylindrical support for the cloth or other material to be sewed. Also in a certain device for confining such looper in its circular vacancy.]

38,932.—Machine for Sawing Shingles and Staves.—Geo. H. Parsons, East Eddington, Maine, administrator of Harvey M. Parsons, deceased, and Thomas N. Egery, Bangor, Maine:

We claim, first, The swinging bolt frame, N, arranged to operate in connection with the circular saw, B, through the medium of the segment rack, O, pulley, P, on shaft, H, arm, I, lever, J, and the serrated arm, D', or their equivalents, substantially as and for the purpose herein set forth.

Second, The manner of feeding the bolt, H', forward in the bolt-frame as herein described; to-wit, by means of the ratchets, E W

pawls, e f, bent levers, S X, connected by the bar, g, and the bar, m, all arranged substantially as set forth.

Third, The toothed cylinder placed in the bolt frame, N, and arranged to operate as and for the purpose herein set forth.

[This invention consists in the employment or use of a swinging or vibrating bolt-frame provided with suitable clogs and a feed-mechanism, all arranged in such a manner as to feed the bolt automatically to the saw which cuts the shingles or other article from the bolt.]

38,933.—Lamp Wick Regulator.—John Pomeroy (assignor to Henry A. Shipman & Robert Headly), Derby, Conn.:

I claim the combination of one or more spur wheels with the center pin or axis fastened together by upsetting the center pin so as to fill a polygonal hole in each spur-wheel and form a collar on each side of it, substantially in the manner and for the purposes set forth.

38,934.—Revolving Fire-arm.—Lucius W. Pond (assignor to himself and John H. Vickers), Worcester, Mass.:

I claim the connection of the several lining thimbles or tubes, C C, at their front ends by means of a ring or flange, D, substantially as and for the purpose herein specified.

[This invention relates to the employment in the chambers of revolving fire-arms of the lining thimbles or tubes to enable fixed ammunition to be used without extending the chambers through the rear of the cylinder, and it consists in so connecting such thimbles or tubes together at their front ends by means of a ring or flange fitting to or against the front of the cylinder that they can all be withdrawn from or inserted into their respective chambers at once thereby greatly expediting the operation of loading.]

## RE-ISSUES.

1,496.—Raking Attachment to Harvesters.—O. H. Burdick, Auburn, N. Y., assignee of Hugh Foresman, Enon, Ohio. Patented May 13, 1856:

I claim, first, In combination with a rake receiving its sweeping motion from a revolving wheel and pin, a raising and lowering mechanism, that brings the rake into position, to clear the platform of the cut grain, and returns it out of reach of the platform for the next sweeping operation substantially as described.

Second, In combination with a sweeping rake, an adjustable crank-pin, for varying the sweep thereof, in the manner and for the purpose described.

Third, The combination of a revolving wheel and pin, with a slotted rake stale, to give the rake its sweeping motion to clear the platform, and to return for the next sweeping motion, substantially as described.

1,497.—Making Illuminating Gas.—Levi L. Hill, Hudson, N. Y. Patented June 17, 1862:

I claim, first, Generating gas for illuminating and other purposes by bringing water and a hydro-carbon fluid simultaneously in contact with freshly formed incandescent charcoal substantially as set forth.

Second, Generating gas for illuminating and other purposes by bringing water and a hydro-carbon fluid simultaneously in contact with freshly formed, incandescent coke, substantially as set forth.

Third, The use of freshly formed, incandescent charcoal or coke for the decomposition of water or a hydro-carbon fluid, or of both combined, when applied simultaneously to the charcoal or coke, for the production of gas for illumination and other purposes, substantially as described.

Fourth, The combination of the gas from the distillation of wood, with that produced from the action of water and a hydro-carbon fluid, simultaneously applied to the freshly formed, incandescent charcoal from the wood in the manner substantially as set forth for the production of gas for illuminating and other purposes.

Fifth, The combination of the gas from the distillation of bituminous coal or its equivalent, with that produced from the action of water and a hydro-carbon fluid, simultaneously applied to the freshly formed, incandescent coke from the coal, in the manner substantially as set forth, for the production of gas for illuminating and other purposes.

1,498.—Filter.—John Kedzie, Rochester, N. Y.—Patented July 11, 1854:

I claim a crock, B, provided with perforations, a a, and the eduction pipe, c, at its bottom; and communicating with the outer air at the top, by means of the pipe, f, or in an equivalent manner, said crock being used in combination with the surrounding packing, C, and receptacle, A, substantially as herein set forth.

1,499.—Reaping and Mowing Machine.—David M. Osborne & Wm. A. Kirby, Auburn, N. Y., assignees by mesne-assignments, of Jeremiah W. Mulley, Amsterdam, N. Y. Patented Feb. 10, 1857. Re-issued Nov. 29, 1859:

We claim in combination with a reel supported on a single reel post, an adjusting mechanism by which the reel may be raised up or let down upon the post, and the reel and post leaned more towards or from the standing grain or grass, as the condition of the crop may require, and substantially as herein described.

1,500.—Machine for swaging Shoe-tips.—American Shoe Tip Company (assignees by mesne-assignments of George A. Mitchell), New Haven, Conn. Patented June 26, 1860:

We claim the die block formed to give the required shape to the outside of a shoe or boot tip, and with its outer face flat to receive and hold the sheet metal blank substantially as described, in combination with a swage of the form of the inside of the tip to be produced, and so operated as to act on the sheet metal blank at an angle, substantially as and for the purpose specified.

And also in combination with a die block and swage having a mode of operation, substantially as herein described, a guide or gage to hold the convex edge of the blank in requisite position relatively to the die, and to resist the force of the swage when it first acts obliquely on the sheet metal blank, substantially as described.

## DESIGNS.

1,763.—Clock Case.—S. B. Jerome, New Haven, Conn.

1,764.—Tea and Coffee Service.—Aloys Meisel, New York City.

1,765 to 1,774.—Carpet Patterns (10 cases).—Elmer J. Ney, (assignor to the Lowell Manufacturing Company), Lowell, Mass.

1,775.—Chromatic Diagram.—S. R. Scofield, Lisle, N. Y.

1,776.—Cooking Stove.—Garrettson Smith & Henry Brown, Philadelphia, Pa., assignors to David Hetrick, Mexico, Pa.

1,777 to 1,788.—Carpet Patterns (12 cases).—Henry G. Thompson, New York City, assignor to the Hartford Carpet Company.

## EXTENSION.

Barrel Machinery.—Reuben Murdock, Rochester, N. Y. Patented June 12, 1849:

I claim, first, The combination of the revolving dogs, m, the pawls, n, the disengaging levers, U, the vibrating feed lever, R, and the stops, q q', whereby the slab is secured on the carriage and successive staves from the same slab.

Second, I claim disconnecting the carriage, N, from the feed gear during its retrograde motion while the slab is being fed towards the saw, J, substantially in the manner and for the purpose herein set forth.

Third, I likewise claim the combination of the oscillating saw, J, with the curved gated case, T, whereby the stave is securely held during the action of the saw in the manner and for the purpose herein set forth.

Fourth, I likewise claim the combination of the stave carriage, Y, with the spring dogs, and spring hold-fast, t, and stop, v, whereby the stave is securely held down during the action of the saws, and then thrown from the machine.

Fifth, I also claim the combination of the concave and convex pressure feed rollers, C' C'', and the self-adjusting spring clamps or rests, K' K'', with the concave and convex cutters, A' A'', when the several members are arranged in the curve of the longitudinal section of the stave as herein set forth.

# Notes and Queries

**M. R., of Md.**—We do not recollect having seen any statement to the effect that the *Warrior's* plating was kept free from barnacles by the application of a new copper paint. We have looked at our foreign files and cannot discover anything distinctly relating to the subject. So many conflicting accounts have appeared respecting the value of this or that paint for ship's bottoms, that we have been obliged to receive them with a great deal of caution. Our iron-clads have been painted with white zinc paint, held to be infallible; and also with red lead but both have proved useless. We cannot, on the authority of a mere paragraph, undertake to decide between the paint spoken of by you and that described in Wetherstedt's patent.

**E. F. J., of Ohio.**—Your question is rather paradoxical—"What pressure is sufficient to prevent the ebullition of water at 900° Fahrenheit?" No direct answer can be given, as the vapor evolved from water at the temperature named would have to be increased very greatly in density, while the heat of the water remained unaltered—a mechanical impossibility in practice.

**R. P., of Pa.**—The engines of which you speak are not made in this country. They are impracticable and have never done anything.

**P. J. S., of Mo.**—We have considered the singular case mentioned by you as occurring in your feed-pump, but cannot account for it on any known scientific theory or principle. If we were on the premises we might account for it, but cannot give any opinion as to the remarkable occurrence spoken of by you, with the limited knowledge of the case in our possession.

**H. T., of N. Y.**—Platinum is soluble in a mixture of hot nitro-muriatic acid (aqua regia). It can be welded at a white heat, and it does not oxidize in the air. When reduced to a spongy porous mass, it becomes red hot when introduced into a mixture of oxygen and hydrogen gas, and the gas is then inflamed. The cause of this action is not understood by chemists or others, as the metal itself does not undergo any change in its character.

**W. R. V., of Pa.**—Fulminating silver is prepared by dissolving silver in nitric acid, then precipitating it by adding caustic potash or lime-water. The precipitatated oxide of silver thus obtained is next washed with water, then drained and digested for twelve hours in cold, strong ammonia. The liquor is next poured off and the powder washed with fresh ammonia and drained on blotting paper. When dry it forms one of the most dangerous of fulminating powders; it can scarcely be touched without exploding.

**R. F., of Ind.**—We have answered the question you propound once before—for another person however. The pressure on a slide valve is wholly due to the area exposed to the steam and is utterly independent of the openings. The valve may be partially relieved, in theory, by back pressure or an imperfect action of the exhaust steam, but stated broadly, the pressure on a slide valve is wholly due to the steam area of the back.

**C. E. M., of N. Y.**—Prescott's work on telegraphy, published by Ticknor & Fields, Boston, is the best that has appeared.

**G. B., of Pa.**—Have you demonstrated that the penetration of a rifle bullet is greater at a distance of twenty feet from the muzzle than at one foot? We have not received any reliable account of experiments to confirm the views which you have presented.

**M. A. R., of N. Y.**—All the milk should certainly be removed from butter that is intended to be laid down in salt for future use, and water appears to be the best agent for washing it.

**C. W. C., of Pa.**—The question of the pressure on the slide valve, which you advert to, does not admit of any argument whatever, to our thinking. We cannot conceive how any one could fall into such an error, and did not misapprehend you in the premises in the least. We must assume that the slide valve *does* fit perfectly when we theorize on its properties. Questions of a want of mechanical skill cannot affect the philosophical principles governing its action. We have seen plenty of face-plates of 75 pounds weight each that lift each other when applied face to face. There are two straight edges in this city, 6 feet long and 2 inches wide, that readily lift each other when applied face to face.

**F. E. B., of Cal.**—Bessemer's process for manufacturing malleable iron and steel from melted pig iron is illustrated and described on page 373, Vol. III. and pages 148 and 164, Vol. V. (new series) of the SCIENTIFIC AMERICAN. Christian Shunk, of Youngstown, Ohio, has obtained an American patent as the first inventor of the same process.

## Money Received

**At the Scientific American Office, on account of Patent Office business, from Wednesday, June 17, to Wednesday, June 24, 1863:—**

D. L. M., of N. J., $30; T. R. T., of N. Y., $35; J. J. D., of N. Y., $20; M. and B. of Ohio, $20; F. J. Z., of N. Y., $16; T. S. D., of N. J., $20; E. A. S., of N. Y., $16; J. A, of N. Y., $10; J. M., of Mass., $20; E. W. and D. D., of N. Y., $16; L. J., of France, $20; E. C., of Ohio, $45; C. J. Van O., of N. Y., $15; C. J. P., of Tenn., $47; C. G. M., of Vt., $16; S. T. S., of Mass., $16; T. L. C., of N. Y., $16; T. E., of Mass., $28; T. B. S., of Ohio $10; S. and G., of Canada $20; H. J. D., of Ill, $25; L. and S. B. H., of Mass., $30; D. H. S., of Iowa, $15; A. W., of N. Y., $16; J. H. L., of Kansas $10; A. C., of Pa., $20; S. L., of N. J., $45; G. W. D., of N. Y., $30; G. B. L., of Vt., $20; N. and D., of N. Y., $20; T. A. M., of N. Y., $16; J. A. G., of Iowa $20; C. and J. A., of N. Y., $20; H. L. B., of N. Y., $20; P. and B., of N. Y., $20; W. K., of Mass., $41; C. D., of Mo., $21; J. A. and J. W. M., of Ind., $35; A. J. A., of Ill., $27; L. and H., of Mass., $25; W. J. F. Jr., of N. Y., $25; J. M. M., of Mass., $16; B. A. H., of Iowa, $21; J. D. W. W., of N. Y., $25; P. W. M., of Ky., $40; S. S. D., of Ill., $29; J. M., of Ill., $10; I. H., of Wis., $16; T. and J. W. W., of Ill., $20; G. W. L., of N. J., $20; G. F., of N. Y., $46; J. H. S., of N. Y., $10; A. J. S., of Cal., $20; J. N. E., of N. Y., $16; J. W. C., of Ky., $16; W. L. R., of Mass., $20; F. J., of N. Y., $10; H. C. A., of Ill., $45; J. T. of N. Y., $20; A. M. B., of Mich., $20; P. S., of Mich., $16; S. M. of Ill., $25; J. A. M., of N. J., $91; A. H., of Conn., $20; W. C. H. of Ohio, $16; H. P., of Maine, $16; F. J., of Wis., $16; J. J. F., of Iowa, $26; N. F. C., of Wis., $20; C. D. B., of Mich., $16; E. W. H., of Ill., $15; S. H., of N. Y., $28; W. H. H., of N. Y., $16; R. L., of N. Y. $16; G. F. C., of Mass., $30; A. A. G., of N. Y., $45.

**Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.**

**Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, June 17, to Wednesday, June 24, 1863:—**

W. K., of Mass.; A. H., of Conn.; L. & H., of Mass.; B. A. H., of Iowa; I. J. F., of N. Y.; L. & S. B. H., of Mass.; C. J. Van O., of N. Y.; L. M. S., of Ill.; W. J. F. Jr., of N. Y.; J. B. S., of Ohio; J. A. M., of N. J. (3 cases); J. D. W. W., of N. Y.; J. A. & J. W. M. of Ind.; S. H., of N. Y.; H. J. D., of Ill.; S. S. D., of Ill.; H. B., of England.

## SANFORD & MALLORY'S

PORTABLE

# FLAX AND HEMP DRESSER.

**Date of Patents, Sept. 16, 1862, and April 28, 1863.**

Over fifty of these machines have been in practical use during the past season, and so great is the demand for the coming fall that we have adopted the following plan, viz: That we will only make to order. Many have already sent in their orders for machines to be delivered next fall. Those who desire to use our machine in dressing the crop of the present season would do well to send their orders without delay, as all machines are delivered according to date of order.

MADE AND SOLD BY

SANFORD & MALLORY,

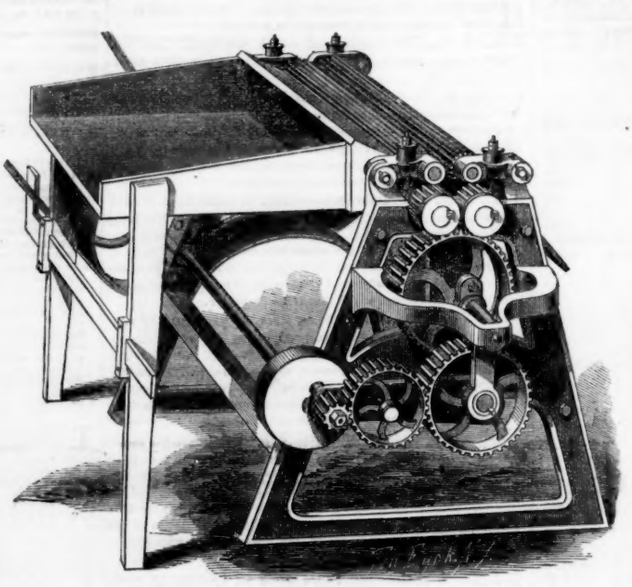
**Harlem Railroad Building, Room No. 26, in White street, near Center street.**

Our terms are cash on delivery of shipper's receipt or bill of lading; and persons ordering can send draft on New York or Treasury notes to some person here whom they know, or by express, to be delivered to us on our delivery of bill of lading for shipment of machine.

Price at our factory, at Paterson, New Jersey:—

For No. 1 Machine (capable of dressing 2500 lbs. of flax straw in ten hours)..... $355
For No. 2 Machine..... $255
For No. 3, Hand Machine..... $155

This engraving represents Sanford & Mallory's Flax-dressing Machine, which is, as will be seen, compactly and strongly built. The cut represents the machine denominated No. 1 by the builders, and is capable of dressing two tons of straw, flax, or hemp per day of ten hours. There is a size before this, No. 0, which is run by power, and is quite similar in all respects except dimensions. Size No. 2 will break from 1500 to 1800 pounds of straw per day, and No. 3, the smallest size, the hand machine, suitable for small growers, from 600 to 800 pounds per day. This latter machine can also be run by power, and is then capable of breaking about 1000 pounds per day.



Many scientific men and men of experience in flax-dressing have examined the Sanford & Mallory machine, have tested its practical operation, and the character of the product yielded by it. They are convinced that the following facts are fully established:—

*First*—A machine capable of dressing 2500 pounds of flax straw in ten hours, can be sold at the factory, ready for shipment, at $355; and the second size, capable of dressing 1500 pounds of straw, at $255. A third size, capable of dressing from 600 to 800 pounds of straw per day, at $155. The smallest size weighs about 300 pounds, and can be run by hand.

*Second*—The yield of flax fiber by the use of this machine, in proportion to the weight of flax straw dressed, exceeds by at least one-fourth that obtained by any other machine or process.

*Third*—The fiber dressed by this machine is much more valuable than that dressed in any other way, on account of the greater yield over the hackle.

*Fourth*—This machine is so simple in its construction and operation that the liability to derangement is very slight.

*Fifth*—This machine does not require in its use any peculiar skill. It can be operated by boys or girls, and does not involve any risk to the hands or arms of the operatives, while the ordinary machines require the use of skilled labor, and, as experience has proved, are always attended with risk to the operatives.

*Sixth*—This machine can be driven by any of the horse-powers in use, and as it can be operated by ordinary farm labor it enables the farmer to dress and prepare for market, at little expense, the flax raised by himself, thus opening to him a new and profitable occupation.

*Seventh*—This machine is small, the largest size occupying only about four feet square, and weighing not over 1100 pounds.

As there is a demand for larger machines for hemp the proprietors are building such, capable of dressing two and a half tuns of hemp straw per day.

The amount of flax fiber produced in the United States in the year 1850 was 7,806,809. Had the straw from which this amount of fiber was taken been dressed by the Sanford & Mallory machine, the yield would have been not less than 10,409,078 pounds. The increased product or the flax saved, at present prices, would be worth $624,542.

When it is remembered that in many of the Western States an immense quantity of flax is raised for the seed alone, the straw being destroyed or wasted as of no value, it will readily be seen that the introduction among farmers and manufacturers of a cheap and effective machine, capable of converting what would otherwise go to waste, into an article of great value, cannot fail to produce the most important results.

It is well known that flax can be successfully cultivated in all the Northern States. If, in addition to the value of the seed (sufficient of itself to pay the entire cost of cultivation), the straw can be made a source of large profit, a wide field of successful industry will be opened.

That the statements here put forward as to the efficiency and value of the Sanford & Mallory machine, and especially as to the great saving effected by it over any other machine or process known, are rather below than beyond the fact, will abundantly appear from the subjoined reports and letters from practical flax-workers and dealers. Nothing need be added to their direct and positive testimony.

Over fifty of these machines for flax and hemp have been in successful use, during the past season, in different parts of the country, and the demand for them is now large; consequently orders for them should be made early, as the coming crop of flax and hemp will soon be ready for dressing.

The demand for flax during the past year and a half has quite doubled its price, and it is now used for many purposes to which it was never before applied, and in which it is found to be superior to cotton and other materials before in use. Whatever, therefore, may be the future product of cotton, the demand for flax will not diminish, but, on the contrary, increase with its new and useful applications. It is now largely mixed with woolen goods of almost every description; is used for paper, wadding, batting, belting, druggets, delaines, calicoes, stockings, felt hats, and carpeting. Should the experiments for *cottonizing* flax for which Congress has made a large appropriation succeed, the already large demand for it would not only be enormously enhanced but made practically unlimited.

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The following testimonials from well-known manufacturers and others are submitted as evidence of the *bona fide* character of the machine, and that it is a practical straight up-and-down affair:—

GREENWICH, N. Y., April 23, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—You ask our opinion in regard to your flax machine. We must say we are well pleased with it. The machine has been in almost constant use since we received it from you—something like six months since; and it, we think, works better now than when we first started it. We advise all our customers to buy your brake in preference to those we formerly made at our machine-shop. Wishing you success in this great invention, we are truly yours,

EDDY, DYER & CO.

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UNION VILLAGE, New York, Nov. 6, 1862.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—I have used two of your patent brakes in my flax-mill since about the middle of October, and take great pleasure in informing you of the results of their operation. Each machine will break easily twenty hundred weight of straw in ten hours. Our tests, which have been very thorough, show twenty-five hundred. The saving of fiber is from six to ten pounds on every hundred of straw.

The following statement of experiments made in my mill will show more clearly what your machine accomplishes.

On the 29th of October we ran 100 lbs. straw with the following results:—

Time occupied in breaking, 22 minutes.
Scutched (by one man) in 46 minutes.
Gave of dressed flax, 23½ lbs.
Gave of coarse and fine tow, 1¾ lbs.

On the same day we broke 50 lbs. straw in 11 minutes.
Scutched (by one man) in 23 minutes.
Gave of dressed flax, 11 lbs.
Gave of coarse and fine tow, 1 lb.

October 30.—We broke 500 lbs. straw in 2 hours 2 minutes.
Scutched (by three men) in 2 hours 59 minutes.
Yield of dressed flax, 106 lbs.
Yield of coarse tow, 16½ lbs.
Yield of fine tow, 5½ lbs.

November 6.—We broke 500 lbs. same quality of straw in the brake heretofore used by us (being one of the best old-fashioned brakes), two men working it, in 1 hour 58 minutes.
Scutched (by three men) in 2 hours.
Yield of dressed flax, 92½ lbs.
Yield of coarse tow, 43 lbs.
Yield of fine tow, 9 lbs.

We then broke 500 lbs. same quality of straw in your machine, two men working it, in 2 hours 10 minutes.
Scutched (by three men) in 2 hours 10 minutes.
Yield of dressed flax, 110½ lbs.
Yield of coarse tow, 16 lbs.
Yield of fine tow, 3 lbs.

You will see from the above that there was apparently more flax in the straw broken on the old machine than in that broken in your new machine. This is owing to the fact that the coarse and fine tow from your machine has less shooves than that from the old machine. Your tow is finer and freer from shoove, and is worth at least a cent per pound more.

The straw used in these tests was of average quality; and in the tests of November 6th of the old and new brakes, the straw was taken from the bulk without sorting. One thousand pounds weight was weighed off in small lots, and divided equally, by weight, between the two machines, the bundles to be broken in either machine were drawn by lot, so that neither machine could have any advantage over the other.

The flax dressed by the use of your machine is left in perfect ribbons, and entirely free from shooves. The fiber is much longer, and the ends left full. There is no risk whatever to life or limb in using your machine,

Yours, respectfully,
HARVY WILCOX.

I was present and assisted at all the experiments above set forth, and know the above statements to be correct

CHARLES BRADLEY.

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STITTSVILLE, N. Y., April 18, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—I have used one of your patent brakes for the past four months. I am highly pleased with it; so much so that I would not be willing to part with it on any conditions, provided I could not obtain another in its place. I feel that it is a very safe machine for the person who operates it; whereas the old brake is not safe, as many persons will testify who have lost an arm by them. I am satisfied that I get more flax and less tow by using the new brake, while both flax and tow are worth more in market than that broken in the old brakes, and certainly the new brake does not require near so much power to run it as the old one, which with many would be quite an object. My brother tells me that he has ordered another brake through your agent, to be used by us, as we are about to unite ourselves in the flax business the coming season. We will want it by the first of August next.

Yours, truly,
WM. B. LINK.

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JOHNSONVILLE, N. Y., April 27, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—I have been using two of your patent flax machines since the 1st of January last. I have given them a thorough test with the old brake. They will save from three to six pounds of dressed flax to the hundred pounds of flax straw (according to the quality of straw used) more than the old brake, and will break from one and one-fourth to one and one-half tons of straw per day of ten hours; do the work better than any other machine I ever saw. It takes out nine tenths of the shive or woody matter in passing through the machine once; consequently it requires less scutching than if broken with the old brake, which does its work very imperfectly—breaking some of the fibers and taking out no shive. My men tell me they would rather rough-dress two handfuls after your brake than one after the old. The fiber from your brake is left perfectly whole and straight, which is better for the manufacturers, as it will hatchel more to the hundred pounds than after the old mode of breaking. I have had a quantity hatched that was dressed after each brake, taken from the same lot of flax, and the yield was five pounds per hundred more after your brake than after the old. The fine tow is equally good with that after the old brake, while the coarse is worth one-third more per ton. I think that if the machine is properly used it is not liable to breakage.

Yours, truly,
WM. H. BUCKLEY.

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UNION VILLAGE, N. Y., May 15, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—I have used two of your patent flax brakes for the past eight months, and take this opportunity of saying that they exceed any brake I ever saw. They take out from sixty to seventy per cent of the shive or woody matter, leaving the fiber whole and in perfect ribbons. They will save from five to eight pounds of dressed flax to every hundred pounds of flax straw over any brake I ever used. We can break from one to one and one-half tuns per day of ten hours with each brake, and there is no danger of life or limb. Yours with respect,

HARVY WILCOX.

---

NORTH HOOSICK, May 16, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—We take pleasure in stating that after having used your brake for some time in the mill of Dr. Fowler, we consider it far superior to the old brake, from the fact that it takes out nearly all of the shive or woody part—we would think at least nine-tenths—leaving the fiber in perfect ribbons and unbroken. It is much easier to scutch after your brake than the old one. We would rather scutch twice the quantity after your brake. Another great and favorable feature of your brake is that it can be operated without risk of life or limb; whereas the old brake frequently takes off an arm. There can be no doubt but your machine will save much more fiber than the old brake.

JAMES HARMON,
THOMAS HARMON.

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BLOOMINGTON, McLEAN Co., ILLINOIS, May 2, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—This is to certify that I have run your Patent Flax and Hemp Brake more or less since the 1st of December, 1862; have broke western tangled straw, and I find that it works complete as it removes at least sixty-five per cent of the shive, and so loosens the rest that they can very readily be shook out, and the stock has a soft oily feel which is worth more than when it has a harsh wiry feel, which is invariably the case with the old machine. I do not hesitate to recommend it to any one as the best machine ever used for breaking flax straw, whether straight or tangled, rotted or unrotted, as my experience has proved it so to my perfect satisfaction. Yours truly,

F. A. HAVENS.

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BELFAST, Ireland, May 1, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—It gives me much pleasure to report that the five Sanford & Mallory Flax Brakes which I have been operating in the different flax districts of Ireland have given entire satisfaction to all who have seen and used them. The saving over all other machines in use is large; on some kinds of straw being as great as one-third. This taken with the saving in labor will give an advantage in favor of the brake of from £3 to £5, or $15 to $25 per day, beside increasing the value of the fiber by scutching and giving it better spinning quality. In conclusion, I would say that the machine has been approved of and recommended by the leading manufacturers of Ireland, and also by the Chemico-Agricultural Society of Ulster.

Yours, respectfully,
EDGAR FOWKS.

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SPRINGFIELD, Clark Co., Ohio, May 5, 1863.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—I have tried one of your brakes, and I have run through thirty-one hundred pounds in ten and one-fourth hours, which was well broken, and every way satisfactory.

I am, gentlemen, yours, respectfully,
E. MEEK.

---

NEW YORK, Sept. 19, 1862.

MESSRS. SANFORD & MALLORY:

*Gentlemen*:—In regard to your new brake I would say that it far exceeds my expectations, both in facilitating the operation of scutching and saving of fiber. I have scutched flax for the last twelve years, and am familiar with the various modes of working flax, but never saw anything that could begin to compare with this. I only regret that the straw was not of a better quality; it is what I call poor straw, and if worked with the machinery now in use would not yield more than 12 to 13 lbs. of fiber per 100 lbs. of straw; and on account of the irregular motion of your scutcher and want of power (as it was a temporary affair), it took much longer to scutch it than it otherwise would. I am confident that with ordinary straw and a good scutching mill I could scutch alone from 170 to 180 lbs dressed flax, if broken on your machine, in ten hours.

I would also state that on account of so many shooves being taken out by your brake, and those remaining in so loose, that it does not require near so much motion of the scutch, which is a great saving of power and fiber, and what little tow is made is fine, and worth three cents per pound; whereas two-thirds of that made by ordinary machines is worth but half a cent per pound, and no sale at that. I cheerfully recommend this brake to all who have flax to dress, as being the machine long sought for.

Respectfully yours,
JAMES CLEARY.

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NEW YORK, June 1, 1863.

MESSRS. SANFORD & MALLORY:

*Dear Sirs*:—Having been in the flax and linen trade for the last fifteen years, and taking a deep interest in everything tending to promote and develope that trade in this country, possessing as it does such immense resources as to enable it, at some future time, to became its own producer of linen fabrics, now so extensively imported from other countries, I have long perceived the want of a machine that would enable every farmer and mill owner, at a small expense, to turn to account the flax straw which is now literally thrown away, and derive from it, as well as from the seed, a legitimate use and profit.

It is estimated that the incredible quantity of three hundred thousand tuns of flax straw, capable of yielding sixty thousand tuns of clear flax, worth now $500 per tun, making the sum of $30,000,000, has been annually thrown away from the want of some cheap and ready process of converting it to use.

This large sum represents but a small proportion of the amount this country could produce, to supply the wants of its own markets as well as those of other countries, were the requisite means afforded.

Looking, therefore, at the great importance of this subject, I am pleased to be enabled to state, that from a close inspection of your flax and hemp machine, and from a careful comparison of it with all those I have ever seen in this and other countries for the purpose of extracting the fiber from the straw, I can give my cordial testimony as to its perfect adaptation to the purposes required.

It has the great advantage of being portable, simple and easy to work, taking but little space, and, above all, of producing more flax from the straw than any other, as from actual test the flax produced by your machine yielded from the straw and hackle, ready to spin into yarn, more line than by any other means now used.

I have also to inform you that, having sent eleven of these machines to England, my reports on their working are highly satisfactory, and that they will be used largely there and in Ireland this year.

Besides extracting more flax from the straw than any other machine, it gives it also more value from the softening quality of the operation on the fiber, said to be not less than $20 to $25 per tun. Some Egyptian flax, as imported, was run through the machine, and was considered to be improved in value full $25 per tun.

I earnestly hope, and you have my best wishes, that your invention will prove as valuable and important to this country as the cotton gin has proved. I remain yours, respectfully,

J. HAWKINS BLACK.

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ROUGHFORT, Ireland, April 9, 1863.

*Dear Sir*:—I have to report to you on the merits of Sanford & Mallory's American brake, which has been at my scutch mill for the last three weeks. I have tried it on various kinds of straw and find the results as follows:—On very poor and hard straw I found a gain of one pound per hundred weight over the same broken by ordinary rollers; on medium quality of straw a gain of two pounds four ounces per hundred weight, the yield by your brake being eighteen pounds four ounces against sixteen pounds on same straw broken by ordinary method; on very tender straw over-watered the gain was three and a half pounds per hundred weight, the yield by your brake being fourteen and a half pounds against eleven pounds by ordinary method. I find the flax from your rollers easier scutched, and the yield softer to feel and quality improved than that rolled in the ordinary way.

Yours truly,
JOHN WILLIAMSON

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BELFAST, Ireland, April 18, 1863.

It will be seen from the foregoing that the saving in over-watered and tender straw is very great. In America even better results have been obtained, and I have several certificates to that effect, but I prefer that the machine should make its way here on its merits, as tested here.

WM. CHARLEY.

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FOR SALE.—A PATENT GRANTED ON MARCH 17, 1863. Described in the SCIENTIFIC AMERICAN, Vol. VII., No. 20. A spring skate which is light and durable, with an improved revolving heel screw. Samples can be seen at Walton's Skate Emporium No. 67 Warren street, or at the owner's, 178 Water street, New York. 25 10* JOSEPH M. YATES.

B. T. BABBITT ON MAKING BREAD, WITH FULL directions on each package of Saleratus, showing how to make the best of bread from materials that farmers always have on hand. Bread made in this manner contains nothing but flour and common salt and water; it has an agreeable taste; keeps much longer than common bread; is more digestible and much less disposed to turn to acid. Common bread, like every thing that has been fermented, ferments again to the great discomfort of many stomachs, and not only so, but acting as a ferment, it communicates to all food in contact with it. The bread being free from all yeasty particles, is more digestible and not so likely to create flatulence or turn acid on weak stomachs as fermented bread is apt to do, and, when of the finest quality, it is beneficial to those who suffer from headache, acidity, flatulence, eructations, a sense of sinking at the pit of the stomach, distension or pains after meals, and to all who are subject to gout or gravel; it is also useful in many affections of the skin: a saving of 25 pounds of flour per barrel is effected by this process. Be sure and get that with B. T. BABBITT'S name on, or you will not get the recipe with sour milk, nor the quality. For sale by store-keepers generally or at the manufactory, Nos. 64 to 74 Washington street, New York. 25 tf

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HOMAN'S "EXCELSIOR" HORSE HAY RAKE.—Those wishing rights in THE BEST, either for manufacture or speculation, should apply immediately. New England States already disposed of. Described in Nos. 22 and 25, Vol. VIII. (new series), of the SCIENTIFIC AMERICAN. Circulars sent free. C. B. HOLMES, Dowagiac, Mich. 25 6*

WANTED—A CLAY-PIPE-MAKING MACHINE FOR making pipe of from 2 inches to 12 or 15 inches diameter inside, for sewerage purposes, with socket joints on. Manufacturers of such will please correspond, stating price, &c., with P. BANNON, Terra Cotta Works, Louisville, Ky. 25 2*

TO SAW-MAKERS.—WANTED, A FOREMAN FULLY qualified to take the entire management of a saw factory. One who has occupied a similar position in some prominent manufactory preferred; or a half-interest in the factory would be sold to such a party on advantageous terms. The works have been long established and have a good reputation. Address Box 2,261, St. Louis, Mo. 25 2*

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THE CELEBRATED CRAIG MICROSCOPE WILL BE mailed, prepaid, for $2 25; with 6 beautiful mounted objects for $3; with 24 objects for $5, by HENRY CRAIG, 180 Center street (3d floor), New York. Liberal discount to dealers.
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BOLTS, NUTS AND WASHERS OF ALL SIZES CONstantly on hand for sale by LEACH BROTHERS, 86 Liberty street New York. 1 13*

COTTON GINS! COTTON GINS!! THE NEW YORK Cotton Gin Company manufacture and offer for sale the Excelsior Roller Gin for Sea Island or long staple cotton; also Brown's celebrated Double-cylinder Saw Gin for upland or short staple. The above Gins are acknowledged to be without their equal; they do more work and produce a better sample than any offered in the market. We also manufacture a large variety of hand Gins, both for long and short staples. Persons intending to order for the coming crop of cotton will do well to do so soon, in order to secure their Gins in season FRANKLIN H. LUMMUS, General Agent, No. 82 John street, New York. 25 13*

AGENTS WANTED IN EVERY PART OF THE country to sell rights of the best paying patent in the market For sample, &c., address B. F. NORTON, Manchester, N. H. 25 3*

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GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York. 1 tf GUILD, GARRISON & CO

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanised rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 500 degs. of heat. The Hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices &c., can be obtained by mail or otherwise at our warehouse. NEW YORK BELTING AND PACKING COMPANY.
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PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All warranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 14 13

TO PERSONS ENGAGED IN MANUFACTURING ARTICLES used in Woolen Mills.—I desire to obtain the address of all persons engaged in manufacturing articles used in Woolen Mills, such as Reed-makers, Shuttle-makers, Bobbin-makers, Picker-makers, Comb-makers, &c.; also manufacturers of Patent Oil-cans, Patent Temples, Patent Heddles and all other patented articles used or connected with Woolen Mills. Parties interested please take notice and send their business card to THOMAS STIBBS, Dealer in Manufacturers' Supplies, Wooster, Ohio. 17 11*

OIL! OIL! OIL
For Railroads, Steamers, and for Machinery and Burning. PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.
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SOLID EMERY VULCANITE.—WE ARE NOW MANUfacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at our warehouse, or circulars describing them will be furnished by mail
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14 13 Nos. 37 and 38 Park-row, New York.

VALUABLE DOCK PROPERTY FOR SALE.—THE subscriber offers for sale a valuable plot of ground on Newtown Creek, near Penny Bridge, in the city of Brooklyn. The property is very desirably situated in the Seventeenth Ward, Meeker avenue, a great thoroughfare, forming the southerly boundary of the premises. A valuable dock privilege of over 400 feet on Newtown Creek, renders the property very desirable for large manufacturing or storage purposes. Vessels of six or eight feet draft can navigate the creek at low tide, and of much greater capacity at high water. The upland and water privilege comprise about nineteen acres, and will be sold very cheap, and the terms of payment made liberal. For further particulars, address J. B. BULLOCK, attorney for the owners, No. 39 Nassau street, New York. 23tf

TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 16tf

IMPORTANT TO THOSE USING STEAM BOILERS.—Blake's Patent Self-regulating Apparatus for supplying boilers with water. It keeps the water at a uniform hight against any pressure. Very simple and sure. All interested can see them in operation at our works, or circulars describing them will be sent by mail. BLAKE & WHEELOCK, 71 Gold street, New York. State rights for sale. 23 5*

FLAX, HEMP, JUTE AND MANILLA.—RICHARD KITSON, Lowell, Mass., manufacturer of needle-pointed card clothing for carding flax, hemp, jute and manilla. 21 14

COMBINED HAND-TRUCK AND BAG-HOLDER.—IT should be in every mill, warehouse and barn. Price only $5. One truck, and patent for a county, $30. A township and a truck, $10. Patent for all the States except Pennsylvania for sale. Circulars free. J. R. Hoffer, Mount Joy, Pa. 23 4*

$75 A MONTH! I WANT TO HIRE AGENTS IN every county at $75 a month, expenses paid, to sell my new cheap Family Sewing Machines. Address S. MADISON, Alfred, Maine. 21 13*

GILLESPIE'S GOVERNOR AND REGULATOR.—THE attention of mill-owners and others is invited to this valuable improvements for regulating the speed of water wheels and steam engines, for which purpose it has never been equaled. Unlike other regulators of water wheels, it is quick and very sensitive. It will move the heaviest gate from one extreme to the other in four or five seconds, if required, always stopping it exactly at the point that the labor requires. It is very simple in its construction, as can be seen by reference to page 328 current volume of the SCIENTIFIC AMERICAN (May 23). All who are troubled with unsteady power can be relieved from all trouble and anxiety, whether using steam engine or water wheel. This Governor, from its peculiar nature, will produce the same speed to a hair, whether the engine be laboring to its full capacity or running entirely free, and we guarrantee the Governor to act quicker than the labor can possibly be changed. For further particulars send for descriptive circular to J. E. GILLESPIE & CO., Trenton, N. J. Messrs. Hanson & Allen, Amsterdam, N. Y., are agents for Central and Western New York. 24 4*

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, May 22, 1863.

NOTICE—THE ATTENTION OF ALL OFFICERS, who have been honorably discharged on account of wounds or disability, and who desire re-enter the service in the Invalid Corps, is called to the provisions of General Orders, No. 105, of 1863, from the War Department, published in the papers throughout the country. Such officers are requested to comply promptly with the provisions of that order, and to send their written applications, as therein provided, for positions in the Invalid Corps (stating the character of their disability), with as little delay as possible, to the Acting Assistant Provost Marshal General of the State in which they may be. Such Acting Assistant Provost Marshal General will at once forward the applications, with his indorsement, to the Provost Marshal General at Washington.
Officers for the Invalid Corps will be appointed immediately upon furnishing the papers required by General Orders, No. 105, of 1863, from the War Department. Their pay and emoluments will commence from date of acceptance of such appointments, and not from date of organization of the respective commands to which they may be assigned. J. B FRY,
24 4 Provost Marshal General.

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, D. C., May 22, 1863.

ALL MEN WHO DESIRE TO JOIN ANY PARTICULAR Regiment of Cavalry now in the field, are hereby authorized to present themselves at any time during the next thirty days to the Board of Enrolment in their respective Districts. The Board shall examine them, and determine upon their fitness for the Service, and if found to be fit, the Provost Marshal of the District shall give them transportation tickets to the general Rendezvous, at the Headquarters of the A. A. Provost Marshal General of the State. As soon as they present themselves at this general Rendezvous they shall be duly mustered by a mustering and disbursing officer, and paid by him the county allowed by law. JAMES B. FRY,
23 4 Provost Marshal General.

DAMPER REGULATORS.—GUARANTEED TO EFfect a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. Orders promptly attended to, or information given, by addressing CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York. Responsible agents wanted. 14 13*

WORTHY THE NOTICE OF LARGE MANUFACTURERS, either in America or Europe. I can reproduce a cheap, permanent and beautiful black dye that answers for cotton, silk and woolen goods, simple and easy. It is patentable, and to be sold. Apply (if by letter, enclose stamp) to M. A. BERK, 17 State street, Newark, N. J. 23 4*

STEVENSON'S JONVAL TURBINE WATER WHEELS, which gave the greatest useful effect over all others, at the trials at Philadelphia, are manufactured at the Novelty Iron Works. Address J. E. STEVENSON, 200 Broadway, New York. 24 4*

WATER WHEELS.—WARREN'S TURBINE WATER Wheel and Turbine Regulator are used successfully in over 500 extensive cotton and woolen mills, where the greatest economy in water is at stake. Send for illustrated pamphlet. Address ALONZO WARREN, Agent for American Water Wheel Company, No. 31 Exchange street Boston, Mass. 24 5*

## THE FAIR OF THE AMERICAN INSTITUTE.

This institution intends holding its annual fair in the Academy of Music, on Irving Place, New York, commencing Sept. 2. Exhibitors can present their goods for admission at any time previous to the 1st of September. We have seen a statement to the effect that the committee had decided not to exhibit any of the machinery in motion this year. The assertion may not be correct, but if it is, such a policy as the one indicated does not augur very much for the enterprise of the Institute and its interest in the welfare of the manufacturing portion of the community. The mere external inspection of a machine affords a very slight insight into its capacity, and the fair will lose half of its attractiveness if the ingenious tools and engines are inert and silent. People go to a fair to see what machinery can accomplish, not to look at the paint and varnish on it; a view of the latter can be had at any time in the manufacturers' warerooms. We do not know what obstacle there is in the way to prevent the committee from exhibiting machines in motion, unless it may be the difficulty of employing steam as a motive power in a convenient part of the city, and we earnestly hope that, before the fall arrives, they will reverse their decision and have machinery exhibited in operation. The long machinery hall has heretofore been one of the most attractive features of the fair, and to see all the engines busy in their revolutions, the tools performing their functions, the saws buzzing and pumps working, gives an air of earnestness and vitality to what would otherwise be a very tame and spiritless exhibition. Let us have the machinery in motion, by all means.

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Echoing Floors.—As houses are now built, floors are apt to be very noisy annoyances. The timbers are so strained up that the floors become resonant like a drum. Now this can be easily remedied at a trifling expense. After laying the under floor, nail down some sawed laths, directly over and across the sleepers. These will show where to lay the upper floor. Now make a mortar of lime and sand, in which the latter ingredient may be in excess. It may be made thin. Pour it on to the floor and spread it just as thick as the laths, and let it dry before laying the second floor. Nail down the upper floor through the laths, and it will seem to you like walking on a brick pavement.

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Hints to Carpenters.—When you start in business, make up your mind not to *chisel* or be *chiseled*. Be liberal to those you employ; it will be *plain* to all that you are no *screw-driver*, and as each day comes around, you will find yourself all *square* with everybody. Make it a *rule* that any man going into the workshop should scrape his boots. Should the *rule* be broken, impose a fine of sixpence, which may be called a *tin tax*. Try all in your power to get your men out of any *vice* they may get into; for instance, if you *saw* them *screwed*, you, of course, would conclude they had been to an ale-house, and warn them that drinking porter to excess in the morning will surely bring them to an early *bier*.

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"Whistling Dick."—A correspondent, writing from Vicksburgh, says the rebels have a gun which domineers the river, and is a pestilent bother to us. They call him "Whistling Dick." No gunboat has any business where this terrible gun can get a shot at it. It shoots a ball two and one-half feet long, steel pointed, weighing two hundred and fifty pounds, can tear through our best iron-clads, and is thought to be the best gun of the war. The writer says it will be some time before Vicksburgh is taken.

[Where is Mr. Lyman and his long accelerating rifle?—Eds.

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A late Liverpool paper says that, however lucrative the fitting-out of blockade-runners was in the early part of the rebellion, it has now become not only hazardous but really dangerous to capital as well as to reputation. Bankruptcy is already making sad inroads into the financial affairs of English merchants who have invested in this species of speculation.

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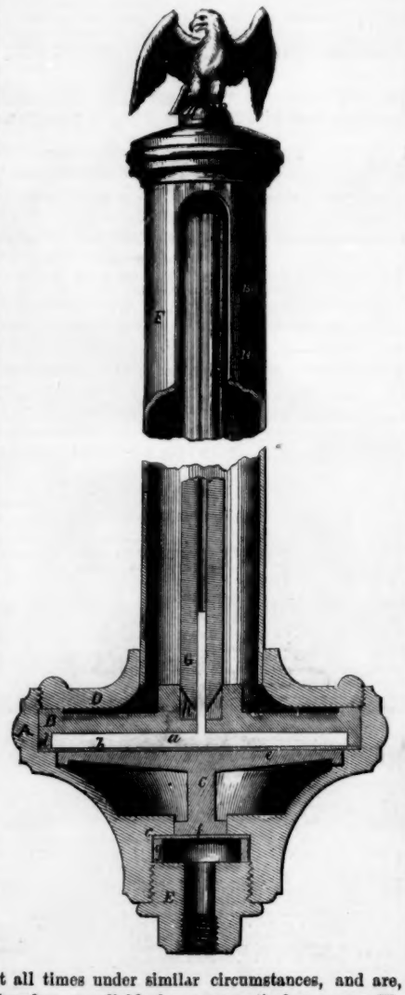
Among a recent lot of mail matter for the Army of the Potomac was a roll of sole leather weighing probably 40 pounds, for a private in one of the batteries, for his own use, with a one-cent stamp only upon it.

## SHAW'S PATENT STEAM GAGE.

The importance of correctly registering the actual pressure of steam in boilers is of the utmost consequence, pecuniarily and physically. By keeping the steam at a stated pressure fuel is saved, and the wear and tear of the boiler is much less where the work is regular and even than where rapid firing takes place to run the steam up, or when cold air is thrown into the furnace by leaving the doors open to check too rapid ebullition. Steam gages are too often wanting in correctness, and do not indicate the same pressure



at all times under similar circumstances, and are, therefore, unreliable for any practical purpose. We illustrate herewith a steam gage on an improved plan, which possesses decided advantages over many in use; the lower part of the gage is cut away to show its internal construction:—The brass cup, A, containing an iron disk, B, is recessed out to form a mercury chamber, *a*. There is also a plunger, C, and the gum diaphragm, *b* and *c*. The cap, D, is screwed into the cup, A, and causes the iron disk to impinge on the diaphragms, *b*, making air-tight joints at the point of contact, *d*. The plunger is a little smaller on its upper surface, *e*, than the mercury chamber, while its lower face, *f*, is of still less area. The plug, E, is screwed into the cup, A, and has an orifice for the insertion of the steam pipe; it presses against the brass ring, *g*, which in turn makes a tight joint through the diaphragm, *c*, on the bottom of the plunger. The brass case, F, incloses the mercury tube, G, whose orifice is directly over that in the disk, thus opening communication with the mercury chamber below. The gum ring, *h*, is placed in a recess in the iron disk and also makes an air-tight joint against the bottom of the tube. These constitute the most noticeable details of this invention. The principle of its operation, says the inventor, is the admission of pressure upon pistons of a different area, giving the mercurial column the advantage of the largest, and by this means employing short columns of quicksilver to balance high pressures of steam. It measures the pressure of steam upon the theory that the column of mercury in the gage exactly balances the pressure in the boiler without the intervention of any other medium or agent. The movement of the plunger is not more than the one-hundredth part of an inch, and this is sufficient to force the mercury up to the top of the tube so that the friction of the rubber diaphragm is not of any moment. Another favorable feature of this gage is that the glass tube is open above to atmospheric pressure, thus avoiding the evil of compressed air—allowance for which has always to be made in graduating gages with glass tubes. A sufficient space is allowed in the mercury reservoir so that the registry is not affected by any change of temperature. This gage is of compact form and is sold at a low price. The invention was patented on Feb. 24, 1863, by Thomas Shaw and assigned to Shaw & Justice, manufacturers, of whom further information can be had by addressing them at 42 Cliff street, New York, or at 14 North Fifth street, Philadelphia.

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FROM THE STEAM PRESS OF JOHN A. GRAY.